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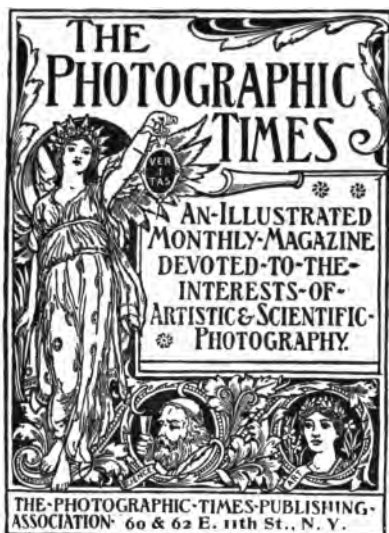
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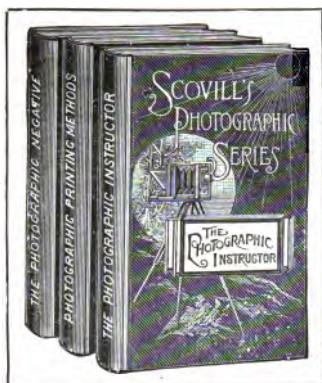
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WITH THE CAMERA

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EDITOR OF

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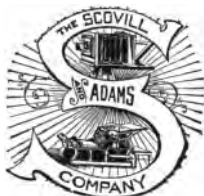
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INTRODUCTION.

To avoid any misunderstanding it would be well to explain that this is not intended as an instruction book in the Art of Photography. It is understood that the reader has already mastered the technical difficulties and is able to make a photographic negative or print. If not, there are many instruction books published from which he may learn.

My purpose here is to describe a number of novel and curious effects that can be obtained by the aid of the camera, together with some instructive and interesting photographic experiments.

The contents of this work have been compiled from various sources, chiefly from *The Photographic Times*, *The Scientific American*, "The American Annual of Photography," *La Nature*, "Photographischer Zeitvertreib," by Herman Schnauss, and "Les Recreations Photographiques," by A. Bergeret et F. Drewin.

I desire to claim nothing for myself. In the words of Montaigne—

"I have gathered me a posie of other men's flowers of which nothing but the thread that binds them is mine own."

WALTER E. WOODBURY,

60 and 62 East 11th St.,
NEW YORK, N. Y., 1896.



PHOTOGRAPHIC AMUSEMENTS.

THE MIRROR AND THE CAMERA.

QUITE a number of novel effects can be obtained by the aid of one or more mirrors. If two mirrors are taken and placed parallel to one another, and a person placed between, the effect



FIG. 1—EFFECT OBTAINED WITH PARALLEL MIRRORS.

obtained is as shown in Fig. 1, where one soldier appears as a whole regiment drawn up into line. To make this experiment we require two large-sized mirrors, and they must be so

arranged that they do not reflect the camera and the photographer, but give only multiple images of the sitter. This will be found quite possible, all that is necessary is to make a few preliminary experiments, adjusting the mirrors at different angles until the desired effect is obtained.

A process of multiphotography which was at one time quite popular consisted in posing the sitter with his back to the camera as shown in Fig. 2 and 3. In front of him are arranged two mirrors, set at the desired angle to each other, their inner edges touching. In the illustrations here given the mirrors are inclosed at an angle of 75 deg., and five reflected images are produced. When an exposure is made and the negative developed, we not only have the back view of the sitter but

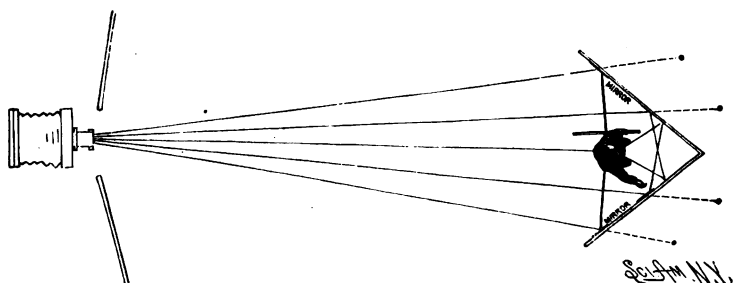


FIG. 2.—DIAGRAM OF THE PRODUCTION OF FIVE VIEWS OF ONE SUBJECT BY MULTIPHOTOGRAPHY.

the full reflected images in profile, and three-quarter positions as well.

In the diagram, Fig. 2, reproduced from "*The Scientific American*," the courses taken by the rays of light determined by the law that the angle of incidence is equal to the angle of reflection is plainly marked out. We see here their passage from the sitter to the mirror and back to the camera. Provided the mirror be large enough images of the full length figure can be made as shown in Fig. 4.

For photographing articles where it is of advantage to secure a number of different views of the same object this method of photographing with mirrors opens up quite a wide

field of possibilities. In France it is used for photographing criminals, and thus obtaining a number of different portraits with one exposure.

The use of an ordinary mirror in portrait work has en-



FIG. 3.—GALLERY ARRANGED FOR MULTIPHOTOGRAPHY.

abled photographers to produce very pleasing results. There is often a very striking difference between the full and side views of a person's face, and by means of such a combination as this, one is enabled to secure a perfect representation of both

at the same time. In making reflection portraits it has often been noted that the reflection has a more pleasing effect than the direct portrait. The reason of this is that it is softer, and the facial blemishes are not so distinctly brought out. There is naturally a slight loss of detail, but this is by no means a drawback. The worst fault of the camera in portrait photography is the tendency to include every little detail which the artist would suppress. It not only includes all the detail but often

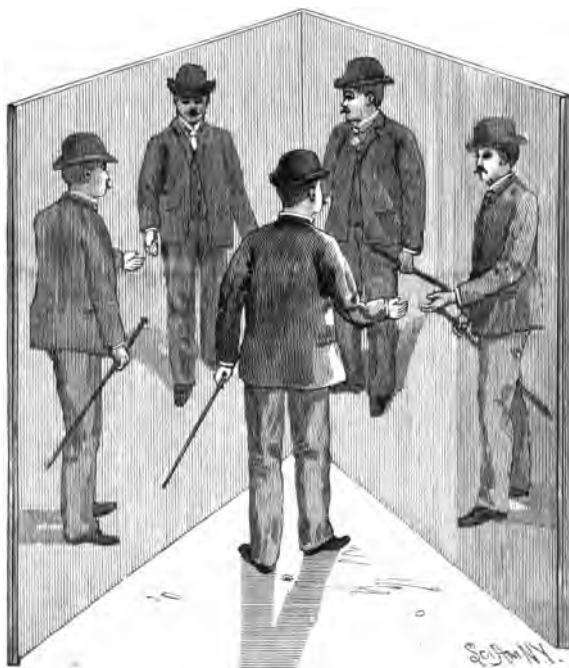


FIG. 4.—MULTI-PHOTOGRAPH OF A FULL-LENGTH FIGURE.

exaggerates it to a painful extent. By making a portrait by reflection this defect is avoided. Of course the image is reversed, but this is in most cases of little consequence; in fact the sitter himself would be more likely to consider it a far more truthful likeness, for when we look into a mirror we do not see ourselves as others see us, but a reversed image. With some faces the difference is quite striking.



By H. L. Bostwick.

FIG. 5. MULTI-PHOTOGRAPH OF CISSY FITZGERALD.

Very many amusing effects can be obtained by the use of a convex mirror. Even an ordinary, well-polished spoon may be made to give some curious results (see Fig. 6). The thin man becomes an oblongated mass of humanity that Barnum would have given a big salary to, while the fat man may be reduced to the proportions of a walking-stick.

Convex mirrors for producing these ludicrous effects can be purchased at any mirror manufacturer's store. The advantage of the camera lies in the ability to secure permanently the curious images produced.

Even more ridiculous-looking images can be secured by the use of a piece of uneven glass silvered. For a method of silvering glass we are indebted to the kindness of Dr. James H. Stebbins, Jr., the well-known analytical chemist. Dissolve pure nitrate of silver in distilled water in the proportion of 10 grains to 1 ounce, and add carefully, drop by drop, sufficient strong ammonia solution to just dissolve the brown precipitate at first formed, stirring constantly during the addition.

Make a solution of Rochelle salts, 10 grains to the ounce of distilled water. Clean the plate of glass thoroughly with a little wet rouge and polish dry with a piece of chamois leather. Warm it before the fire or in the sun to about 70 to 80 deg. Fahr., and lay it on a perfectly level surface. Then mix 1 ounce of the silver solution with half an ounce of the Rochelle

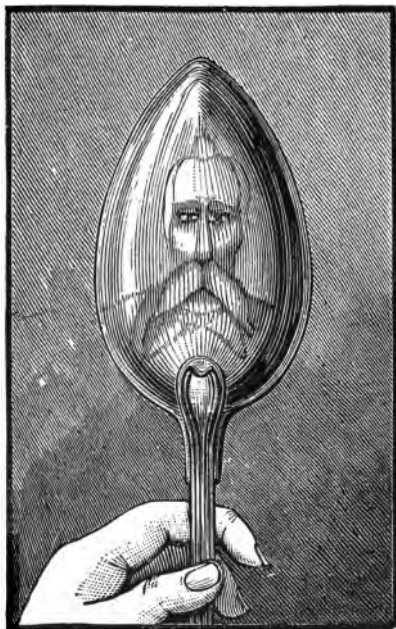


FIG. 6.—ELONGATED REFLECTION
IN A SPOON.

salt solution and pour the mixture on the glass, so that every part of the surface will be evenly covered with it.

Allow this to stand in the warm sunshine from half to one hour, when the reduced silver will be deposited as a fine film



NO. 7.—CURIOUS EFFECT OBTAINED WITH A CONVEX MIRROR.

over the surface of the glass. When this is done wash off the glass with distilled water and wipe the entire surface very gently with a little wet wadding, which will take off the roughness and render it easier to polish. When perfectly dry the

silver should be polished by rubbing with some smooth, hard surface. The plate is then varnished by pouring over it a suitable varnish and is ready for use.

THE PHOTO-ANAMORPHOSIS.

THE name anamorphosis has been given to two kinds of pictures distorted according to a certain law, and which are of such a grotesque appearance that it is often impossible to recognize the subject of them; while viewed with proper

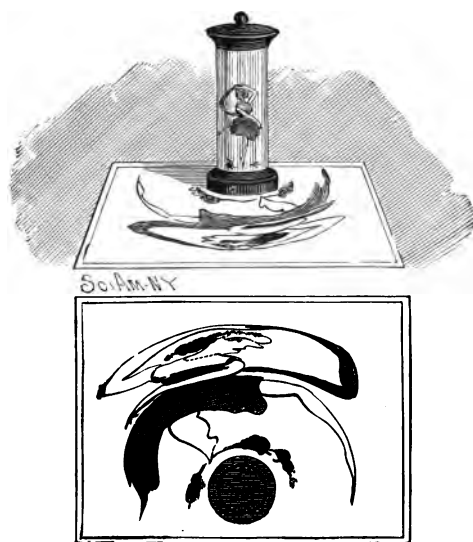


FIG. 8. ANAMORPHOSIS VIEWED IN CONVEX CYLINDRICAL MIRROR.*

apparatus they appear as perfectly correct images. One kind is designed to be viewed by reflection and the other is reconstituted by means of a special rotary apparatus.

Until quite recently, these pictures were drawn approximately from the reflection of the object as seen in a convex

* From "Experimental Science." Published by Munn & Co., New York.

STATUETTE PORTRAITS.

THESE were at one time quite popular, and if properly managed can be rendered very effective. There are several methods of making this kind of picture. If the photographer possesses a pedestal large enough, all that is necessary is to place this on a stand and the person to be photographed arranged behind.

The breast is uncovered and some white soft material artistically arranged in folds over the shoulders and in such a way as to appear connected with the pedestal. A black background is placed behind and the exposure made. To give a more realistic effect the hair, face, and all other parts showing should be liberally powdered over with a white powder or rice flour. The negative produced will have a clear glass background, but the body of the figure will still be visible. This is removed by cutting away the film round the pedestal and to the arms on each side, leaving only those parts remaining that are required to produce the statuette. In printing we get a white statuette portrait on a dark background.

If the photographer does not possess a pedestal the next best means to produce these pictures is to get a large sheet of cardboard and cut it out to the shape shown in the figure beneath, and with white paint make the picture of a pedestal shading with a little gray to give rotundity. The figure is stationed behind it, and a black background used.



FIG. 12.

A third method involves still less trouble. This is to purchase a ready made pedestal negative. These are film

negatives of a pedestal that can be adjusted to the negative of

the subject desired to be reproduced as a statue. After the negative is taken and varnished the film is scraped off round the figure, cutting off the body as shown in the first illustration, after which the pedestal negative is adjusted, fastened, and



By G. B. Bradshaw.

FIG. 13. STATUETTE PORTRAIT.

then printed. The negative is reversible and can also be used for different subjects. The picture shown in Fig. 13 is made by Mr. G. B. Bradshaw, of Beech House Altrincham, England, by means of one of his pedestal negatives.

MAGIC PHOTOGRAPHS.

TAKE an ordinary silver print and fix it without toning. Thoroughly well wash it to remove all traces of the fixing

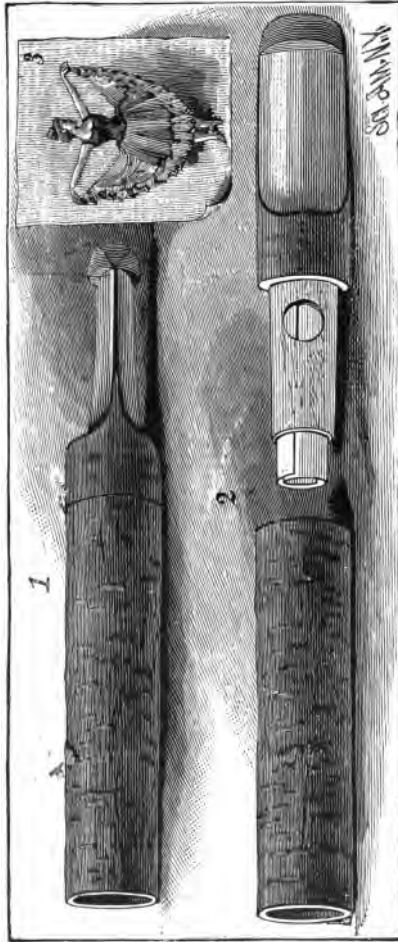


FIG. 14. CIGARETTE TUBE FOR MAGIC PHOTOGRAPHS.

solution and then immerse it in a saturated solution of bichloride of mercury, when the image will disappear. The bichloride of mercury changes the photograph into white

chloride of silver and chloride of mercury which is also white. The image when on white paper is thus rendered invisible.

Next soak some strong bibulous paper in a saturated solution of sodium hyposulphite, and, when dry, paste a piece of the paper to the back of the invisible print with a little starch paste attaching it by the edges only. All that is necessary is



FIG. 15. DEVELOPING THE IMAGE.

to soak the print in a little water, which dissolves the sulphite and causes it to attack the print and make the image perfectly visible as a brown picture. Of course the image can also be made to appear by soaking the invisible print, without the bibulous paper attached, in a solution of sodium sulphite, hypo, or water with a little ammonia added.

Magic photographs made in the manner above described can also be developed by smoke. A novelty introduced in Paris some time ago, consisted of a cigarette or cigar holder, shown in Fig. 14, containing in its stem a little chamber for the insertion of a small piece of apparently plain paper, but in reality invisible photographs produced in the manner already described. The ammonia vapor in the smoke passing through the chamber attacked the print and developed the image. By blowing the smoke on the latent image it may be made to appear, but the operation is rather tedious, and anyone with a little ingenuity can easily construct a cigarette holder with an arrangement to hold small pictures and allow the smoke to pass through.

The chamber of the cigarette or cigar holder must of course be sufficiently large to allow of the print being inserted in such a manner that the smoke can readily attack its surface, otherwise uneven development of the image will take place.

SPIRIT PHOTOGRAPHY.

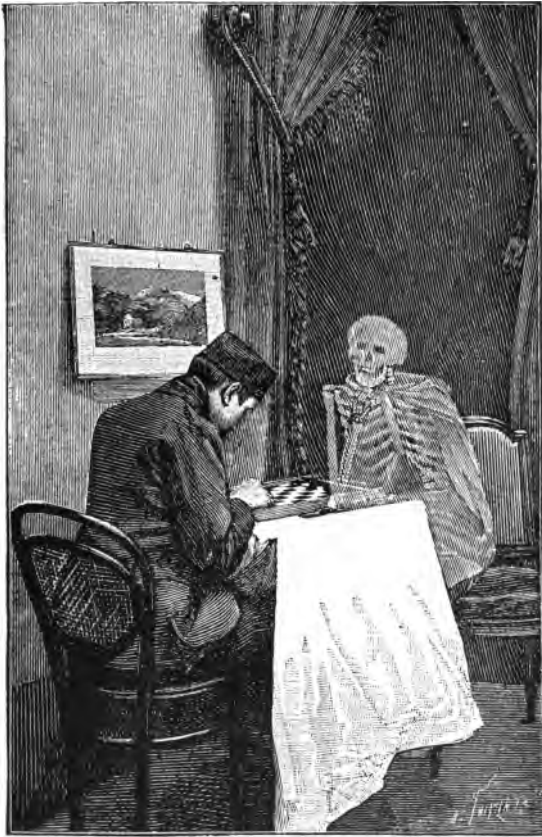
MANY years ago, in the old wet-collodion days, a well-known photographer was one day surprised by the visitation of a spirit. The apparition did not make its appearance during the nocturnal hours, as is, we have been given to understand, the custom of these ladies and gentlemen from the other world, but, strangely enough, in broad daylight; and not by his bedside to disturb his peaceful slumber, but upon the photograph



FIG. 16. A "SPIRIT" PHOTOGRAPH.

he was in the act of producing. Had this gentleman been of that soft-brained kind, so easily gulled by the professional spiritualist, it is possible that he would not have done what he did, which was to make a thorough and scientific examination as to the probable cause of the phenomenon. The case was this: A gentleman sitter had been taken in the usual manner upon a collodion plate. Upon taking a positive print from

the negative, he was surprised to find a dim white figure of a lady apparently hovering over the unconscious sitter. Upon examination of the negative, the image of the figure was also visible, but not so plainly as in the positive. The explanation



From *La Nature*.

FIG. 17. SPIRIT PICTURE.

of the whole matter was soon made easy. In those days glass was not so cheap as at present, and all new or spoilt negatives were cleaned off and freshly prepared with collodion for further use. In this case the glass had previously supported

the negative image of a lady dressed in white. Some chemical action had evidently taken place between the image and the glass itself, turning the latter slightly yellow in some parts. This faint yellow image, although hardly visible in the nega-



From *La Nature*.

FIG. 18. SPIRIT PICTURE. .

tive, had, being of a non-actinic color, given quite a distinct image in the positive. The case was not an isolated one, as these spirit photographs, as they were called, often made their appearance when old negatives were cleaned and the glass

used again. The precise action producing the image has never, we think, been satisfactorily explained. It could often be made more distinct by breathing on the glass. We do not know if any enterprising humbug ever took advantage of this method of producing spirit photographs to extort money from the unwary, but about ten years ago a work was published, entitled "Chronicles of the Photographs of Spiritual Beings and Phenomena Invisible to the Material Eye," by a Miss Houghton. In this a number of reproductions of photographs of "spirits" were given with a detailed explanation of how they were obtained and the difficulties attending their production, the "spirits" being apparently of very independent natures, only making their appearance when they felt so inclined. It is quite possible that a person entirely ignorant of photographic methods might be led into the belief that they were actually photographic images of the dead, but we fear that the book is hardly well enough written to deceive the experienced photographer. At certain and most unfortunate periods in the process employed, some of the plates had a convenient habit of slipping into the washing tank and there, according to the author, becoming utterly ruined; also we learn that many were ruined by being accidentally smudged by the photographer's fingers. We should not, we fear, have a very high opinion of an operator who was in the constant habit of "smudging" negatives with his fingers so as to entirely spoil them, nor can we quite understand what brand of plates was used that "got spoiled by falling into the water."

It is not difficult to explain how these pictures were produced. There are quite a number of methods. With a weak-minded sitter, over whom the operator had complete control, the matter would be by no wise a difficult one. It would then only be necessary for the spirit, suitably attired for the occasion, to appear for a few seconds behind the sitter during the exposure and be taken slightly out of focus, so as not to appear too corporeal.

If, however, the sitter be of another kind, anxious to discover how it was done and on the alert for any deceptive prac-

tices, the method described would be rather a risky one, as he might turn round suddenly at an inconvenient moment and detect the *modus operandi*. In such a case it becomes necessary to find some other method where it would not be requisite for the "spirit" to make its appearance during the presence of the sitter.

The ghostly image can be prepared upon the plate, either before or after the exposure of the sitter. The method is this: In a darkened room the draped figure to represent the spirit is posed in a spirit-like attitude (whatever that may be) in front of a dark background with a suitable magnesium or other arrangement light thrown upon the figure, which is then focused in the "naturalistic" style; or, better still, a fine piece of muslin gauze is placed close to the lens, which gives a hazy, indistinct appearance to the image. The exposure is made and the latent image remains upon the sensitive plate, which is again used to photograph the sitter. Upon developing we get the two images, the "spirit" mixed up with the figure. The spirit should be as indistinct as possible, as it will then be less easy for the subject to dispute the statement that it is the spirit-form of his dead and gone relative. Some amount of discretion in this part of the performance must be used, we fancy, otherwise the same disaster might happen as did to a spiritualist some little time ago. An elderly gentleman had come for a *séance*, and, after some mysterious maneuvers, the gentleman was informed that the spirit of his mother was there. "Indeed!" replied the gentleman, somewhat astonished. "What does she say?" "She says she will see you soon," informed the medium. "You are getting old now and must soon join her." "Quite right," replied the old gentleman; "I am going round to her house to tea to-night."—Total collapse of spiritualist.



FIG. 19.

"SPIRIT" PICTURE
"DISTURBED SLUMBER."



FIG. 20.—PHOTOGRAPH OF "SPIRITS."

Fluorescent substances, such as bisulphate of quinine, can also be employed. This compound, although almost invisible to the eye, photographs nearly black. If a white piece of paper be painted with the substance, except on certain parts, the latter only will appear white in the picture.



FIG. 21. PAINTING BY N. SICHEL.

From which "Spirit" Photograph was made.

We hope that it will not be inferred that we desire to explain how to deceive persons with regard to photographs of spirits, for this is not so ; we only hope that they will be made

merely for amusement, and if possible to expose persons who practice on the gullibility of inexperienced persons.

Fig. 20 is a reproduction of a "spirit" photograph made by a photographer, claiming to be a "spirit photographer," and to have the power to call these ladies and gentlemen from the "vasty deep" and make them impress their image upon the sensitive plate by the side of the portraits of their living relatives.

Fortunately, however, we were in this case able to expose this fraud. Mr. W. M. Murray, a prominent member of the Society of Amateur Photographers of New York called our attention to the similarity between one of the "spirit" images and a portrait painting by Sichel, the artist.

A reproduction of the picture is given herewith, Fig. 21, and it will be seen at once that the spirit image is copied from it.

In a recent number of *The Australian Photographic Journal* we read of the following novel method of making so-called spirit photographs: "Take a negative of any supposed spirit that is to be represented, put it in the printing frame with the film side out; lay on the glass side a piece of platinotype paper with the sensitive side up; clamp in place the back of the printing frame and expose to the sun for half a minute. Now place in the printing frame the negative of another person to whom the spirit is to appear, and over it put the previously exposed sheet film side down; expose to the sun for two minutes until the image is faintly seen, then develop in the usual way and the blurred spirit photograph will appear faintly to one side or directly behind the distinct image. Sheets of paper with different ghost exposures can be prepared beforehand."

Spirit photograph might easily be made by means of Prof. Roentgens newly discovered process of impressing an image upon a photographic dry-plate without uncovering the shutter. The process would however entail considerable expense and would necessitate the use of so much costly apparatus that we will content ourselves with the simple mention of the possibility.

PHOTOGRAPHY FOR HOUSEHOLD DECORATION.

How few amateur photographers there are who thoroughly enter into the enjoyment of the art-science as a pastime. Many of these, perhaps, must be excused for the reason that they are ignorant of its capabilities. Indeed, how many there are who imagine that the art of photography consists in making negatives and, from these, prints—good, bad and indifferent. All the friends and relations are called into requisition “to be taken.” At first they do not mind, thinking it a fine thing to have a portrait made for nothing; but when they see the result they very naturally object to be caricatured, and the amateur loses many a friend, and the maiden aunt leaves all her money to the home for stray cats. If he is a married man and delights in a happy, cosy home, neatly and artistically decorated, photography can be of very great assistance to him—how much, few realize. There are a thousand different ways in which it can be of use, and the photographer has always before him some permanent record of his travels and skill.

Let us take, for instance, the making of transparencies.

These are very simply made. Carbutt, I believe, supplies plates ready made for the purpose. Every amateur becomes pos-

sessed after a time of a large number of negatives, good, bad, and indifferent. Let him carefully go through these, selecting all the printable ones and pictures that he mostly



FIG. 22.

admires. From these, transparencies can be made, either by contact, or enlarged or reduced in the camera. Persons residing in cities often have a nicely furnished room utterly marred by an unsightly outlook. Perhaps a view of chimney pots and dirty back yards. In such a case all that is necessary is to fit in the lower panes of glass some neat photographs on glass backed with thin ground-glass. These can be puttied in, or they can be fitted in neat brass frames and hung up against the windows.

The craze of the present day appears to be in the direction of bright and gaudy colors, except with the more highly cultivated, who recognize the artistic value of unobtrusive colors and delicate tints. A photograph, provided it is a good one, is always to be preferred to colored pictures unless the latter are by good artists. We once constructed with a half dozen of transparencies a very neat lamp shade. Some idea of it can be obtained from Fig. 23.

A brass frame is first constructed, and any wire maker will execute this, so as to hold the six or eight pictures. The transparencies are made, cut down to the size and shape required and fitted in small brass tabs at the back to keep them in their places behind the transparency; then ground glass of the same size and shape is fitted. The glasses should not fit too tightly in the brass frames or on expanding by the heat they will crack.

A hall lamp can be treated in the same way, the colored glass removed and photographic transparencies substituted. Photos on glass can in the same way be used for a variety of other purposes, such as fire screens, candle shades, etc.

Next look up your stock of prints, scraps, waste prints, etc.



FIG. 23.

Often from a large, spoilt picture you can get a neat little bit about a couple of inches square or less; look up all these and from them a photographic chess-board can be made. Our illustration in Fig. 24 is intended to show what is meant, although our artist has not been happy in the selection of his material to represent photographic views and portraits. First mark out a square the size you wish the chess-board to be. Divide it into sixty-four equal squares and draw a neat border round it. Thirty-two of the squares are then neatly pasted

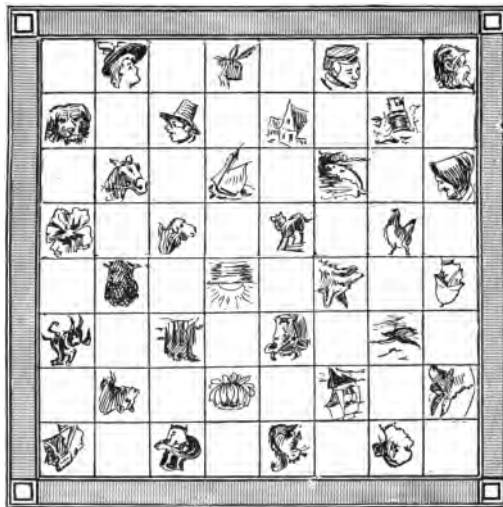


FIG. 24.

over with selected photographs as varied as possible in subjects. Sixteen are fitted one way and sixteen the other. Our illustration is incorrect in this respect. The sixteen pictures should be placed the right way on the sixteen squares nearest to each player. When the photographs have all been pasted on and dried the whole is sized and varnished. If, however, it is desired to preserve this photographic chess-board, and at the same time to use it frequently, a better plan is to cover over with a glass plate and bind all round the edges to prevent dust from entering.

In a similar way a neat card table can be manufactured. Fig. 25 is intended to illustrate the top of the table covered with photographs and protected by a glass plate.

A little consideration will no doubt give various other similar ideas to the reader.

Those who can work the carbon process successfully have it in their power to transfer photographs in various colors to all kinds of supports to wood for instance. The panels of a door can be very considerably improved by the insertion of photographs on fine grain wood, varnished.



FIG. 25.

Pictures can in this manner be transferred to plates, china and ornaments of every description.

Various methods of printing on silk and various fabrics have from time to time been given. Perhaps the best for our purpose is the primuline process, as various colored images can be produced, with but little trouble, on all kinds of material. A description of the process will be found in another part of this work.

These the amateur can hand over to his better half or female relations, who with the natural feminine abilities will produce all sorts of pretty artistic articles for decorating the room.

We are well aware that we have by no means enumerated one half of the various means in which photography can be employed for decorating the house, but hope at least to have given the reader some idea of what its capabilities are.

LEAF PRINTS.

NOTHING can exceed the beauty of form and structure of the leaves of different plants. Ruskin observes: "Leaves take all kinds of strange shapes, as if to invite us to examine them. Star-shaped, heart-shaped, spear-shaped, fretted, fringed, cleft, furrowed, serrated, sinuated; in whirls, in tufts, in spires, in wreaths, endlessly expressive, deceptive, fantastic, never the same, from footstalk to blossom, they seem perpetually to tempt our watchfulness and take delight in outstripping our wonder." Photography has placed in our hands a simple method of preserving facsimilies of their every varying shapes that will last long after the leaf has died and crumbled to dust. Although the discovery of the darkening action of silver chloride when exposed to light was discovered



FIG. 26. LEAF PRINT. BY T. GAFFIELD.

by Scheele as far back as 1777 little was apparently known of the possibilities attending the discovery until 1839, when Fox

Talbot read a paper on "A Method of Photogenic Drawing," in which he described various experiments that could be made with paper coated with this substance, and showed many pictures of leaves, ferns, and pieces of lace which he had obtained.



FIG. 27. LEAF PRINT.

BY T. GAFFIELD.

The illustrations which we reproduce herewith are reproductions from leaf prints made by Mr. Thomas Gaffield, who has made quite a study of this fascinating pastime. In a little work entitled "Photographic Leaf Prints," published in 1869, he describes his method. The leaves and ferns are first

selected and pressed between the leaves of a book. They must not be dried as in that state they do not so readily permit the light to pass through and the delicate structure of the leaf would not be reproduced. They should therefore only be pressed sufficiently to allow the excess of moisture to be extracted. A sheet of glass is put into the printing frame and the leaves artistically arranged. When the arrangement is satisfactory the leaves are attached to the glass with a little mucilage to prevent them from slipping out of their places. A sheet of sensitive paper, albumen, aristo, or platinum is then inserted, the frame closed up and exposed to the light until a very dark print is obtained. The time required in printing must be found by practice; it will, of course, differ according to the intensity of the light. It is a good plan to employ an actinometer to judge of the correct exposure. It is not possible to open the frame as a double or blurred picture would result. The leaves should be exposed sufficiently long to enable the light to penetrate through them and give a distinct image of the veins and structure.

When the printing is completed the paper is removed and toned and fixed in the usual manner. If platinotype paper is used, this, of course, requires development. The resulting picture gives us a light impression of the leaves on a dark background, but if so desired, the print thus obtained can be used as a negative. It can be made transparent with wax or vaseline, and prints obtained from it giving a dark image on a white ground. It is difficult to say which picture is the more beautiful. We give illustrations of pictures of both kinds. Fig. 26 and 27.

Naturally enough the beauty of these pictures lies in the careful selection and arrangement of the leaves. Those which are too thick should not be used. Delicate ones showing by transmitted light, all the veins are the most suitable. They can be arranged artistically in any shape, or form. We prefer, however, a life-like arrangement to the construction of various shapes and designs.

TO MAKE A PEN AND INK SKETCH FROM A PHOTOGRAPH.

By the following method anyone can, without any knowledge of drawing, produce from a photograph a pen and ink sketch suitable for reproduction as an illustration. From the negative a silver print is made on albumen or gelatine or collodion paper. This is fixed without toning in a solution of hyposulphite of soda. It must then be thoroughly washed to remove all traces of hypo, and when dry, the outlines of the photograph are traced over with a fine pen and a waterproof ink, obtainable at any artist's material store. If the photographer possesses a little knowledge of drawing some of the shading can also be attempted. When the ink is dry the picture is immersed in a saturated solution of bichloride of mercury (poison) when the photograph will disappear, leaving the outline sketch intact. The picture is again well washed and dried. Newspaper sketches are often made from photographs in this manner, a zincotype being quickly produced from the drawing.

PHOTOGRAPHS ON SILK.

PHOTOGRAPHS can be made very effective printed upon silk, satin, or other fabrics. There are several methods of accomplishing this. A simple one is the following:* The silk best suited for the purpose is that known as Chinese silk, and this is first washed in warm water with plentiful lather of soap; then rinse in hot water, and gradually cool until the final washing water is quite cold. Next prepare the following solutions: Tannin, 4 parts; distilled water, 100 parts. Sodium chloride, 4 parts; arrowroot, 4 parts; acetic acid, 12 parts; distilled water, 100 parts.

The arrowroot is mixed up into a paste with a little of the distilled water, and the remainder added boiling hot, with the acid and the salt previously dissolved in it. When the solution

* From the "Encyclopædic Dictionary of Photography," by the author.

is quite clear the tannin solution is added, and the whole allowed to get fairly cool. The silk is then immersed for about three minutes, being kept under without air in the folds, and then hung up to dry, or stretched out with pins on a flat board. The material is then sensitized by brushing over with the following solution: Silver nitrate, 12 parts; distilled water, 100 parts; nitric acid, 2 drops to every 3 ounces. Other methods of sensitizing are by immersing in or floating on the silver solution. After sensitizing, the material is dried by pinning on to a board to keep flat. It is then cut up as required, and printed behind the negative. Every care must be taken in printing to keep the material flat, and without wrinkles or folds. It must also be kept quite straight; otherwise, the image will be distorted. Printing is carried on in the same manner as with albumenized paper. It is then washed and toned in any toning bath. The sulphocyanide gives the best action. Fix in a 10 per cent. solution of hyposulphite of soda for ten minutes; wash and dry spontaneously. When just damp, it is ironed out flat with a not over-heated iron. Black tones can be obtained with a platinum toning bath, or with the uranium and gold toning bath, made up as follows: Gold chloride, 1 part; uranium nitrate, 1 part. Dissolved and neutralized with sodium carbonate, and then added to sodium chloride, 16 parts; sodium acetate, 16 parts; sodium phosphate, 16 parts; distilled water, 4,000 parts.

Very effective results may be made by printing with wide white margins, obtained by exposing with a non-actinic mask.

Another method is the following: Ammonium chloride, 100 grains; Iceland moss, 60 grains; water (boiling), 20 ounces.

When nearly cold this is filtered, and the silk immersed in it for about fifteen minutes. To sensitize, immerse the silk in a 20 grain solution of silver nitrate for about sixteen minutes. The silver solution should be rather acid.

Or immerse the silk in water, 1 ounce; sodium chloride, 5 grains; gelatine, 5 grains. When dry, float for thirty seconds on a 50 grain solution of silver nitrate. Dry slightly, over print and tone in the following bath: Gold chloride, 4 grains; sod-

ium acetate, 2 drachms; water, 29 ounces. Keep twenty-four hours before using. Fix for twenty minutes in hypo, 4 ounces to the pint of water.

PHOTOGRAPHING A CATASTROPHE.

On this page we reproduce a curious photograph by M. Bracq, which appeared some time ago in the *Photo Gazette*.



By M. Bracq.

From Photo Gazette

FIG. 28. A CATASTROPHE.

Despite all the terrible catastrophe which it represents, carrying pictures along with him in his fall the subject has not exper-

ienced the least uneasiness, not even so much as will certainly be felt by our readers at the sight of the tumble represented.

The mode of operating in this case is very simple and we are indebted to *La Nature* for the description of the method employed by M. Bracq. The photographic apparatus being suspended at a few yards from the floor of the room, in such

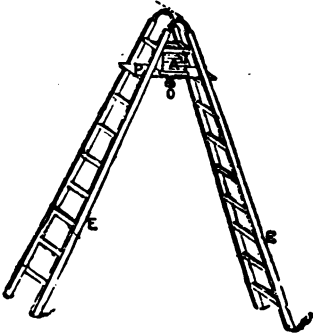


FIG. 29.

a way as to render the ground-glass horizontal (say between the two sides of a double ladder—a combination that permits of easy focusing and putting the plates in place), there is spread upon the floor a piece of wall paper, about 6 feet in length by 5 feet in width, at the bottom of which a wainscot has been drawn. A ladder, a few pictures, a statuette, and a bottle are so arranged as to

give an observer the illusion of the wall of a room, that of a dining room for instance. A hammer, some nails, etc., are placed at the proper points. Finally, a 5 feet by $2\frac{1}{2}$ feet board, to which a piece of carpet, a cardboard plate, etc., have been attached, is placed under the foot of a chair, which then seems to rest upon this false floor at right angles with that of the room.

Everything being ready, the operator lies down quietly in the midsts of these objects, assumes a frightened expression, and waits until the shutter announces to him that he can leave his not very painful position. This evidently is merely an example that our readers will be able to modify and vary at their will.

PHOTOGRAPHS ON VARIOUS FABRICS.

By means of a dye process known as the "Primuline Process," very pretty images in various colored dyes can be made upon silks, satins, cotton goods, etc. The material is first dyed in a hot solution of primuline, made by adding about 15 to 30 grains of the dye to a gallon of hot water; a little com-

mon salt should also be added. On immersing the fabric, and stirring it about in the solution, it becomes of a primrose yellow color, when it is removed and washed under a cold-water tap. The next process is to diazotise it by immersion for half a minute or so in a cold solution of sodium nitrate, one-quarter percent. which has been sharply acidified with hydrochloric or other acid. The material is again washed in cold water, but it must be kept in a weak light. It can be hung up to dry in the dark, or exposed while wet beneath the object of which it is required to produce a positive reproduction. This process gives a positive from a positive, so that any ordinary picture on a sufficiently translucent material—flowers, ferns, etc.—can be reproduced. Printing requires about half a minute in the direct sunlight to half an hour or more in dull weather, or if the material to be printed through is not very transparent. The high light becomes of a pale yellow, so that a faint image is perceptible; but this is made visible in almost any color by development in a weak solution (about one-fourth per cent.) of a suitable phenol or amine. The following have been found suitable:

For Red.—An alkaline solution of β -naphthol.

For Maroon.—An alkaline solution of β -naphthol-disulphonic acid.

For Yellow.—An alkaline solution of phenol.

For Orange.—An alkaline solution of resorcin.

Brown.—A slightly alkaline solution of pyro-gallol, or a solution of phenylene-diamine-hydrochloride.

For Purple.—A solution of α naphthylamine hydrochloride.

For Blue.—A slightly acid solution of amidol, β naphthol, β sulphonate of sodium, now better known as "eikonogen."

If the design is to be made in several colors, this can be done by painting on the different developers, suitably thickened with starch. After developing, the material is well washed and dried. With the purple and blue developers it is necessary to wash the material finally in a weak solution of tartaric acid. Wool and silk require a longer exposure to light than other fabrics, and cannot be successfully developed with the maroon or blue developer.

SILHOUETTES.

SILHOUETTE portraits were at one time very popular. They are simply made, and if the effect is well carried out will afford considerable amusement. The best description of their manufacture was given some time ago by Herr E. Sturmann, in *Die Photographische Correspondenz*. His method is as follows :

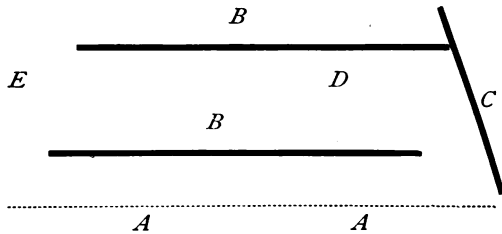


FIG. 30.

Place two dark back-grounds in parallel position about 4 feet from the sky and side light of the studio and distant from each other about six feet. Improve a dark tunnel by draw-



FIG. 31.

ing a black cloth, of non-reflecting material, over the two dark grounds, and arrange a white screen, somewhat larger than the distance between the two dark grounds in an oblique position so as to be fully illuminated.

A A. The sky and side light. B B. Two dark back-grounds. C. The white screen in oblique position. D. The subject. E. The camera.

The subject to be silhouetted must be placed in the centre of the tunnel, one side of the face turned towards one ground, but comparatively nearer to the white screen so that the side of the face turned towards the camera is as much as possible in the shade.

Focus must be taken accurately, so that the outlines of the figure are perfectly sharp.



FIG. 32.

As it is the object to obtain a perfectly transparent, glass-clear silhouette upon an absolutely opaque ground, but a very short time of exposure is required.

Develop as usual and to secure perfect opacity intensify more than usual. Plates of lower sensitiveness invariably give the best results. A slow plate or one made particularly for reproductions is well adapted for this kind of work. With ferrous oxalate of hydrochinon developer there is scarcely any need of intensifying.

To obviate the shadows cast upon the floor by the lower parts of the figure, place it upon a thick, large plate-glass, sup-



FIG. 33.

ported by props of five or six inches in height, and spread



FIG. 34.

upon the floor under the glass a piece of white muslin. The muslin must be free of folds or wrinkles, and be so con-

nected with the white screen, that the division line between is not reproduced upon the plate.

The very feeble shadows of the feet can be easily touched away with pencil.

Single persons or groups of two or three figures can be photographed in this peculiar style with very good effect. For head and busts expose in the usual manner, but to obtain silhouettes, similar to those our grandmothers had cut in black paper, and long before photography was thought of, cut an appropriate mask of black paper to cover the part not wanted during printing.



FIG. 35.

It should be born in mind that in this class of work the white background only is the object to be photographed, hence the necessity of but very short exposures. With longer exposures absolute blacks and whites are impossible.

PHOTOGRAPHING THE INVISIBLE.

THE following is a curious and interesting experiment, based upon the peculiar property possessed by fluorescent substances of altering the refrangibility of the chemical light rays. Take a colorless solution of bisulphate of quinine, and write or draw with it on a piece of white paper. When dry the writing or design will be invisible, but a photograph made of it will show them very nearly black.

HOW TO MAKE A PHOTOGRAPH INSIDE A BOTTLE.

GET a glass-blower to make an ordinary shaped wine-bottle of very thin and clear glass, and clean it well. Next take the white of two eggs and add to it 29 grains of ammonia chloride dissolved in 1 drachm of spirits of wine, and one-half ounce of water. Beat this mixture into a thick froth.

and then allow it to stand and settle. Filter through a tuft of cotton-wool, and pour into the specially made bottle. By twisting the bottle round, an even layer of the solution will deposit itself on the sides. Pour off the remaining solution, allow the film in the bottle to dry, and again repeat the operation.

The next operation is to sensitize the film with a solution of nitrate of silver, 40 grains to 1 ounce of water. Pour this in and turn the bottle round for a few minutes, then pour off superfluous solution and again dry. Hold the neck of the bottle for a few seconds over another bottle containing ammonia, so as to allow the fumes to enter it. Printing is the next operation; this is accomplished by tying a film negative round the bottle, and covering up all the other parts from the light. Print very deeply, keeping the bottle turning round all the time. Toning, fixing, and washing can be done in the ordinary way by filling the bottle up with the different solutions. The effect is very curious, and can be improved by coating the inside of the bottle with white enamel.

PHOTOGRAPHS IN ANY COLOR.

THESE can be produced by what is known as the powder or dusting-on process. The principle of the process is this: An organic, tacky substance is sensitized with potassium bichromate, and exposed under a reversed positive to the action of light. All these parts acted upon become hard, the stickiness disappearing according to the strength of the light action, while those parts protected by the darker parts of the positive retain their adhesiveness. If a colored powder be dusted over, it will be understood that it will adhere to the sticky parts only, forming a complete reproduction of the positive printed from. Prepare—Dextrine, one-half ounce; grape sugar, one-half ounce; bichromate of potash, one-half ounce; water, one-half pint; or saturated solution bichromate of ammonia, 5

drachms; honey, 3 drachms; albumen, 3 drachms; distilled water, 20 to 30 drachms.

Filter, and coat clean glass plates with this solution, and dry with a gentle heat over a spirit lamp. While still warm the plate is exposed under a positive transparency for from two to five minutes in sunlight, or from 10 to twenty minutes in diffused light. On removing from the printing frame, the plate is laid for a few minutes in the dark in a damp place to absorb a little moisture. The next process is the dusting on. For a black image Siberian graphite is used, spread over with a soft flat brush. Any colored powder can be used giving images in different colors. When fully developed the excess of powder is dusted off and the film coated with collodion. It is then well washed to remove the bichromate salt. The film can, if desired, be detached and transferred to ivory, wood, or any other support.

If a black support be used, a ferrotype plate on Japanned wood, for instance, pictures can be made from a negative, but in this case a light colored powder must be used. The Japanese have lately succeeded in making some very beautiful picture in this manner. Wood is coated over with that black enamel for which they are so famous, and pictures made upon it in this manner. They use a gold or silver powder.

With this process an almost endless variety of effects can be obtained. For instance, luminous powder can be employed and an image produced which is visible in the dark.

Sometime ago we suggested a plan of making what might be termed "post-mortem" photographs of cremated friends and relations. A plate is prepared from a negative of the dead person in the manner described, and the ashes dusted over. They will adhere to the parts unexposed to light, and a portrait is obtained composed entirely of the person it represents, or rather what is left of them. The idea is not particularly a brilliant one, nor do we desire to claim any credit for it, but we give it here for the benefit of those morbid individuals who delight in sensationalism, and who purchase and treasure up pieces of the rope used by the hangman.

THE DISAPPEARING PHOTOGRAPH.

A method of making a photograph which can be made to appear at will is thus described in *Les Recreations Photographique*:

TAKE a convex watch crystal, V, or any similar glass larger if desired—for instance, those used for colored photographs; clean the glass well, place it perfectly level, convex side down, and fill it even full with a mixture of white wax and hog's-lard. When it has solidified, apply to the back a flat glass plate, P, cut exactly to the largest dimensions of the convex



FIG. 36.

glass, secure the glasses together with a strip, B, of gold-beaters' skin, fastened by strong glue as shown in the figure. Now mount a portrait, with the front towards the convex glass, on the plate P. The combination is now ready; by heating it the wax between the two glasses melts and becomes transparent, allowing the portrait to be seen; on cooling it will lose its transparency and the portrait will disappear.

FREAK PICTURES WITH A BLACK BACKGROUND.

If an object be placed against a non-actinic background and an exposure made, the black parts surrounding it will not have any effect upon the plate, and the object can be shifted to another part and another exposure made. In a recent article published in *La Nature*, and translated in the *Scientific*



FIG. 37.—A DECAPITATION.

American, a number of curious effects obtained by M. R. Riccart, of Sainte Foix les Lyons, are described and illustrated.

The system employed by the author of these photographs is that of the natural black background obtained through the open door of a dark room, combined with diaphragms skill-

fully arranged in the interior of the apparatus, between the objective and sensitized plate. This is the surest method of obtaining the desired effect with the greatest precision, without the junctions being visible, and with perfect clearness for the section of the parts removed. To this effect, it is necessary to place the diaphragm at three or four centimeters from the ground glass, in the last folds of the bellows of the camera.

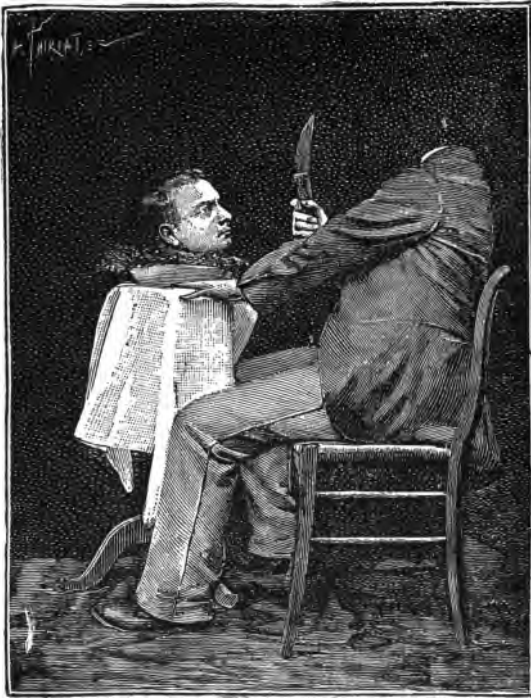


FIG. 38.—ANOTHER DECAPITATION.

The following are a few data as to the manner in which the scenes that we reproduced were obtained. The first, representing a decapitation by means of a saber (Fig. 37), was taken by means of an exposure in which the head was placed upon the block, the subject inclining forward upon his knees, and a

diaphragm, occupying about two-thirds of the plate, completely masking the body up to the neck. Then, without changing the position of the apparatus, the diaphragm was placed on the other side in order to conceal the head, and the body was photographed in the second position along with the person representing the executioner. It would have been possible, by a third exposure, to so arrange things as to make the executioner the decapitated person. It was by the same process that the three following scenes were obtained: A per-

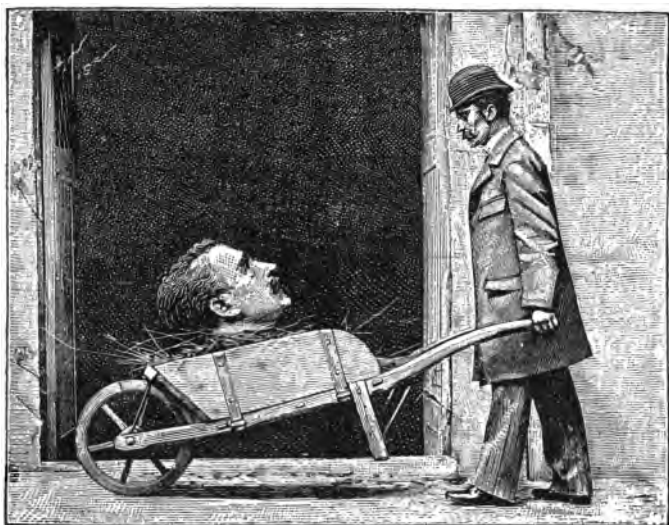


FIG. 39.—THE HEAD IN THE WHEELBARROW.

son with his head placed before him in a plate (Fig. 38); a man carrying his head in a wheelbarrow (Fig. 39); and a person to whom his own head is served in a plate (Fig. 40). Such scenes may be varied to any extent. Fig. 41 is a photograph of a decapitation, while Fig. 42 is made by two exposures of an individual at different distances but so combined as to give the appearance of one exposure. Fig. 43 is that of a person in a bottle. The individual represented was

first photographed on a sufficiently reduced scale to allow him to enter the bottle. This exposure was by using a screen containing an aperture, as for the Russian background. But this precaution was taken merely to conceal the floor, and yet it



FIG 40.—THE HEAD UPON A PLATE.

would perhaps be preferable in such a case to have the subject stand upon a stool covered with a very black fabric. However this may be, when once the first impression has been made, there is nothing more to be done than to photograph the bottle on a larger scale and the result is obtained.

HOW TO COPY DRAWINGS.

THERE are three principal methods of copying mechanical drawings, tracings, sketches, etc. These are : (1) A process to obtain white lines upon blue ground ; (2) a process by which blue lines upon a white ground are obtained ; and (3) a process giving black or violet-black lines upon a white ground.



FIG. 41.—THE SAWED-OFF HEAD.

The first process is undoubtedly the simplest, as after printing upon the paper it is developed and fixed by simple immersion in cold water ; but, at the same time, the white lines on the blue ground are not so clear and effective as the other processes. The cyanotype paper, as it is called, can be

obtained ready for use at any draughtsman's stores, but if you prefer to make it yourself, here is the recipe: Two solutions are made—20 parts of red prussiate of potash are dissolved in 100 parts of water, and 10 parts of ammonio-citrate of iron in 60 parts of water. These two solutions should be mixed together immediately before using, and the operation must be performed in the dark. Paper is floated on this solution, or



FIG. 42.—THE REDUCTION.

applied with a broad camel-hair brush, and hung up to dry. If it is well dried and carefully preserved from light, moisture, and air this paper will keep for some time. After printing—which, when sufficient, should show the lines copied of a yellow color upon a blue ground—the prints should be washed in several waters; and if a few drops of chlorine

water or dilute hydrochloric acid be added to the washing water, the blue ground will appear much darker and the lines rendered clearer and whiter. By this method the commercial paper sold is generally prepared. The prints, may, if desired, be changed from blue to black by immersing in a 4 per cent. solution of caustic potash until the blue is changed to yellow. After being well washed, they are laid in a solution of tannin.



FIG. 43.—MAN IN A BOTTLE.

Blue prints may be given the black tone by plunging them into a solution of 4 parts of potash in 100 parts of water; then, when the blue color has entirely disappeared under the action of the potash, and a yellowish color has taken its place, they are immersed in a solution of 4 parts of tannin in 100 parts of water; then, washing them again, we obtain prints whose tone may be assimilated to that of pale writing ink.

In the process giving blue lines upon a white ground, it is necessary that the action of the light shall be to convert the iron compound into one that can be discharged from instead of being fixed on the paper, so that we obtain a positive from a positive. Abney describes the process as follows: Thirty volumes of gum solution (water 5 parts, gum 1 part) are mixed with 8 volumes of a citrate of iron and ammonia solution (water 2 parts, double citrate 1 part), and to this is added 5 volumes of a solution of ferric chloride (water 2 parts, ferric chloride 1 part). This solution thus formed is limpid at first, but will gradually become thicker, and should be used soon after mixing. It is then applied with a brush to the paper (which should be well sized) and dried in the dark. Exposure is accomplished in a few minutes, the paper being placed under the drawing in the printing frame. It is then developed with potassium ferrocyanide, 50 grains, water 1 ounce, applied with a brush until all the details appear of a dark-blue color. The print is then rapidly rinsed, and placed in a dish containing the clearing solution, made of 1 ounce of hydrochloric acid and 10 ounces of water.

The third process, which gives violet-black lines on a white ground, is the following: Make up the sensitive solution with water, 16 ounces; gelatine, 4 drachms; perchloride of iron (in a syrupy condition), 1 ounce; tartaric acid, 1 ounce; sulphate of iron, 4 drachms. The paper is floated on or brushed over with this and dried. The exposure is about the same as with the last process. When sufficient, the greenish-yellow color will turn white, except the lines, which should be somewhat dark. The developing solution is composed of 1 part of gallic acid in 10 parts of alcohol and 50 of water. When immersed in this solution the lines will turn blacker. The finish is then made by thoroughly washing in water.



SYMPATHETIC PHOTOGRAPHS.

THESE are obtained as follows : A sheet of paper is coated with a ten per cent. solution of gelatine, and when dry this is floated on a ten per cent. solution of bichromate of potash. Again dry and expose beneath a positive transparency. The print thus obtained is then immersed in a ten per cent. solution of chloride of cobalt. The parts unacted upon by light will absorb the solution. Wash and dry. We then have a faint image which will alter its color according to the state of the atmosphere. In damp weather it will be almost if not entirely invisible, but when the weather is fine and dry, or if the image be heated before a fire it will turn to a bright blue color.

DRY-PLATES THAT WILL DEVELOP WITH WATER.

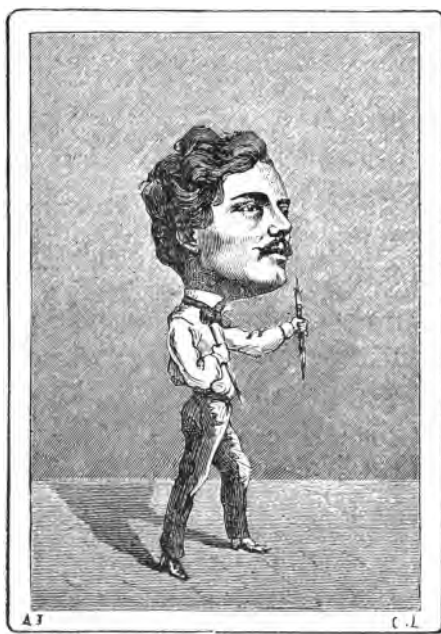
SOME time ago dry-plates were placed on the market which would develop, apparently, with water and a little ammonia only. The secret of the method was that the backs of the plates were coated with a soluble gum, containing the developing agents, and, of course, when the plate was immersed in the water, they instantly dissolved and formed the developer. Plates thus prepared are useful in travelling where it is not always possible to get the necessary developing solutions. To prepare them the backs are coated with the following mixture ;

Pyrogallie acid.. .. .	154 grains
Salicylic acid.....	15 grains
Gum or dextrine.....	154 grains
Alcohol	1 fluid dr.
Water.....	5 fluid dr.

This is allowed to dry at an ordinary temperature. After exposure, all that is necessary to develop is to immerse the plates in water containing a small quantity of ammonia.

CARICATURE PHOTOGRAPHS.

THERE are quite a number of different methods of making caricature portraits. A simple one is to make two photographs of an individual. One of the head alone and another of the entire body on a much smaller scale. From these two negatives prints are made, the larger head is cut out and pasted on to the shoulders of the full length figure. Any signs of the



From Tisandier's Handbook.

FIG. 44. CARICATURE PORTRAIT.

cutting out are removed by the use of a brush and a little coloring matter. From this combined print another negative is made so that any number of these caricature prints can be made without extra trouble. This effect is shown in Fig. 44.

Foregrounds for making caricature portraits are sold in this country. The method of using them is shown in Fig. 45.

The card containing the grotesque drawing is held by the sitter on his knees and arranged by the photographer in such a way that his head rests just above the neck of the painted body. A white background is arranged behind and when the negative is made all traces of the edges of the foreground are removed by careful retouching.

Another method of obtaining grotesque caricature portraits has been devised by M. Ducos du Hauron. His apparatus which he calls "La Photographie Transformiste," is thus described by Schnauss in his "Photographic Pastimes." "A Fig. 46 is the front of the box which is furnished with an exposed shutter formed of a simple sliding piece fitting into the grooves R R, R R." B B'' are two screens pierced with slits



FIG. 45.—CARICATURE.

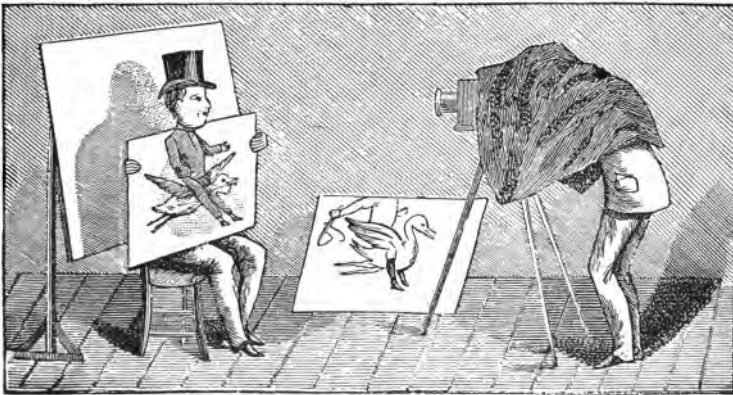


FIG. 46.—MAKING THE CARICATURE PORTRAIT.

a a, c c. C is the rear end of the box where the dark slide is placed. D is the lid of the box, which is lifted either for placing the slotted screens or for putting in the sensitive plate.

When not working direct from nature, the transparency is placed in the grooves R R, R R, at A.

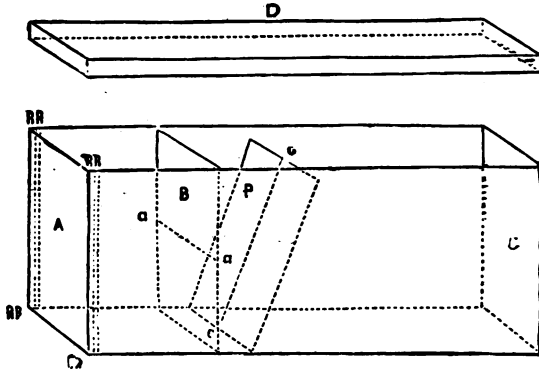


FIG. 47. THE HAURON "TRANSFORMISTE."

According to the arrangement of the slits, the caricatures obtained will be different. If, for instance, the first slit be a

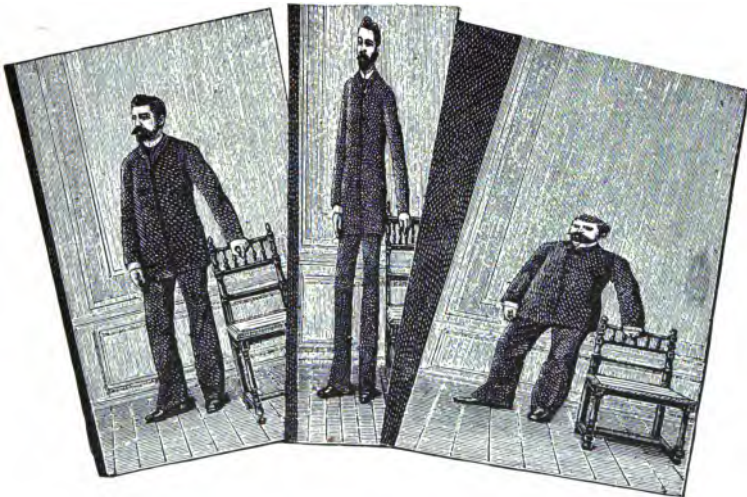


FIG. 48. PHOTOGRAPH AND DISTORTIONS WITH THE "TRANSFORMISTE."

vertical one, and the other, *i.e.*, the one nearest the picture, a horizontal one, the picture, in comparison with the original, will

be distorted lengthwise. If, however, one of the slits forms no straight line, but a curved one, the transformed picture will show either lengthwise or sideways curved lines, according to the slit being a vertical or a horizontal one. The form



FIG. 49.



FIG. 50



FIG. 51.



FIG. 52.

of the resulting picture will also be different according to which one of the slotted plates is inserted more or less obliquely in the box,

The slits must be made very exactly; above all, their edges

must be absolutely sharp, every incorrectness being transferred to the picture. They may be made about one-third of a millimetre wide; if they are too narrow the picture will not turn out sharp. In making the slits it is a good plan to cut them in thin black paper, and to mount the latter on glass plates.

In a later description of the apparatus we learn that the

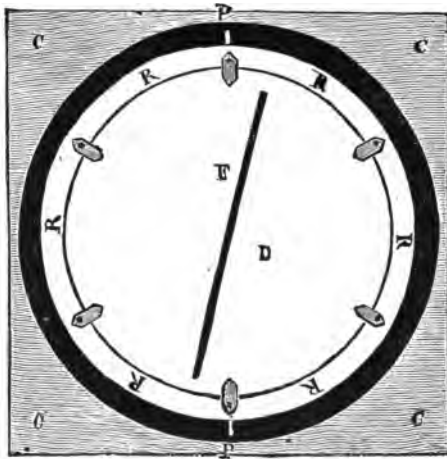


FIG. 53.

discs containing the slits are never made circular in shape and so arranged that they can be revolved as shown in Fig. 53. This, of course, allows of a still greater variety of positions of the two apertures in relation to each other and an increasing number of grotesque effects. Reproductions of some of the pictures obtained are given.* See Figs. 48 to 52.

*Reprinted from *La Science en Famille*.

PHOTOGRAPHING SEA-WEEDS.

Of all the glorious creations of nature few are more beautiful than the delicate sea mosses to be found by the sea shore. Many delight in preserving them in a dry state, mounted on cards, but unfortunately they are usually so



FIG. 54. SEA WEED PHOTOGRAPH.

fragile that after a little while they fall to pieces. The photographer, however, is able to reproduce these beautiful formations and preserve them in a more permanent form by

means of his camera. It is true that he cannot reproduce their delicate colorings, but the photographs can, if so desired, be lightly printed on platinum paper and colored as well as possible by hand.

STAMP PORTRAITS.

A SPECIAL camera is sold for making these little pictures.



FIG. 55. STAMP CAMERA.

It contains a number of lenses all of the same focus. In front is an easel where the portrait is attached surrounded by a suitable border. The images given are about the size of postage stamps (see Fig. 56), and when the negative is printed from an albumen or aristo paper, toned and fixed, they can be perforated and gummed at the back. They are very useful for sticking to letters, envelopes, and for business purposes.



FIG. 56.

STAMP PHOTO.

LUMINOUS PHOTOGRAPHS.

THERE are several different ways of making these. Obtain some Balmain's luminous paint, and coat a piece of cardboard with it. Place this in the dark until it is no longer luminous; place this behind a glass transparency and expose the light, either daylight or, if at night-time, burn a small piece of magnesium wire. Return to the dark, remove the transparency, and a

luminous photograph is obtained on the prepared card. A simple plan is to merely expose a piece of the prepared card-board to the light and place it behind a transparency; then retire to a darkened room. The luminous paint, showing through it, will have a very pretty effect. If no glass transparency is at hand, a silver print can be used, if previously oiled and rendered translucent by vaseline or any other means.

FLORAL PHOTOGRAPHY.

PERHAPS the beauties of nature are nowhere better exemplified than in flowers, and nothing can be prettier than photographs of them carefully arranged. When we say carefully arranged we mean, of course, artistically. The secret of arranging flowers—an art in itself—is to hide the fact that they have been arranged.

The charming pictures of flowers and fruit which appear on this page and the next, are by John Carpenter, an English gentleman, who has made this particular branch of photography his chief study, and has been awarded many prizes and medals for flower studies.

Some time ago we wrote to him asking for a few particulars of his method adopted, and he has been so very kind as to send the following valuable notes :

Suitable Flowers.—I find that the best colors to photograph are pale pink, yellow, white or variegated colors. Reds, browns, and dark colors generally, do *not* answer well.

Flowers of irregular form are most suitable, such, for example, as chrysanthemums, lilies, poppies, etc. These give beautiful gradations of light and shade.

Grouping.—There is great scope here for artistic feeling. All appearance of formal arrangement must be avoided and a natural grouping should be aimed at. This becomes more difficult as the flowers must be somewhat on one plane to get them in proper focus. A round bunch of flowers which may appear very pretty to the eye would probably be utterly wrong to make a picture of.



J. Carpenter.

FIG. 57. FLORAL STUDIES.

Lighting.—I have never worked in a studio but have a small lean-to glass house in which I work. The top light is softened down by light shades so that the strongest light comes from the side. This gives solidity to the subject and is more pleasing than a flat lighting. Of course, the sun should never shine on the subject.

Plates and Exposure.—If colored flowers are being photographed, orthochromatic plates are a necessity, but for white flowers and light-green foliage ordinary plates may be employed. I generally use a medium isochromatic, stop the lens to $f/22$ and give exposure of from thirty to sixty seconds in summer and vary according to the season; sometimes twenty minutes is not too much.

Development.—My usual and favorite developer is pyro-ammonia, and in careful hands it cannot be beaten. I commence development with a minimum of pyro and work tentatively.

Using 100 per cent. solution for 2 ounces of developer I should commence with $1\frac{1}{2}$ grains pyro, 1 grain bromide, and 2 grains ammonia. If the image does not gain sufficient density add more pyro and bromide, but unless very fully exposed it is difficult to avoid too much density, especially if white flowers are being photographed.

I find a plain gray or dark background most useful, and to avoid flatness it may be set at an angle and not too near the subject.

Flowers should be photographed as soon as gathered, and if possible be placed in water. I have often found a plate spoiled by movement of the leaves or flowers, even with short exposures, although the movement was not perceptible to the eye. This is more especially the case in hot weather.



DISTORTED IMAGES.

TAKE a portrait negative that is no longer of any use, and immerse it in a weak solution of hydrofluoric acid. The film will leave the glass. It is then washed and returned to the glass support. By stretching the film one way or the other, and allowing it to dry in this position, the most amusing prints can be made.

PHOTOGRAPHS WITHOUT LIGHT.

A CURIOUS experiment showing that a photographic dry-plate can be otherwise affected than by light, so as to form an image upon it, is the following :

An image of copper in relief is necessary—a penny will do for this purpose. Place an unexposed dry plate in a normal pyro developer, and on it lay the copper coin. After about five minutes or so, remove the penny, fix and wash the plate, when a perfect image of the penny will be found on it.

ELECTRIC PHOTOGRAPHS.

SIMILAR experiments to that described above have been carried out by Prof. Fernando Sanford. He placed a coin on a dry-plate and connected it with the terminal of a small induction coil, capable of giving a spark of three or four millimeters, while a piece of tin foil upon the opposite side of the plate was connected with the other terminal of the coil.

Several negatives were made in this way, the accompanying photograph, Fig. 58, being from one of them. With one exception, they all show a fringe around them, due to the escape of the charge from the edge of the coin, which accounts for the formation of the dark ring observed around the breath figures made upon glass.

Later on he undertook to photograph in the same way objects insulated from the photographic plate, and has since

made negatives of coins separated from the plate by paraffine shellac, mica, and gutta percha. The accompanying photograph, Fig. 59, was made with the coin insulated from the

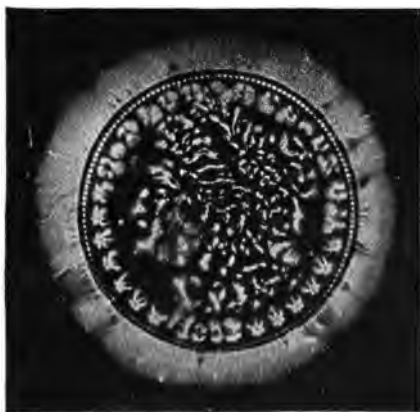


FIG. 58.

photographic plate by a sheet of mica about 0.04 mm. thick. The mica was laid directly upon the film side of the plate, and the coin was placed upon it and connected to one terminal of the small induction coil already mentioned. A circular piece of tin foil of the circumference of the coin was placed upon the glass side of the plate directly opposite the coin, and

was connected to the other terminal of the induction coil. The little condenser thus made was clamped between two boards, and was covered up in a dark room. Two small discharging knobs were also attached to the terminals of the induction coil, and were separated by a space of less than a millimeter, so that, when a single cell was connected with the primary coil, the spark between the knobs seemed continuous.

The plate was exposed to the action of the waves set up in this condenser for one hour, when it was taken out and the negative image developed upon it by the usual process.

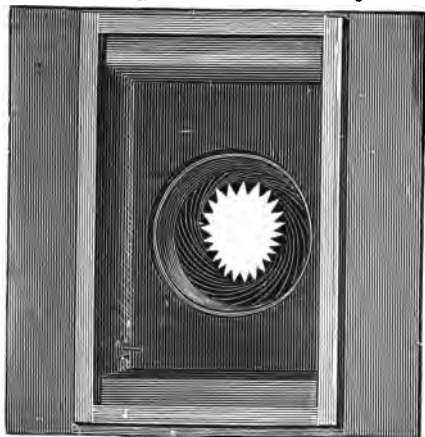


FIG. 59.

MAGIC VIGNETTES.

THESE are reversed vignettes, that is to say the margins round the portrait instead of being white as in the ordinary vignette are black. A method of making them was recently described by "Teinte" in *The Photogram*. This was as follows:

Two methods can be adopted. The first of these about to be detailed, though entailing, perhaps, in the first place a trifle more trouble, produces the best results. We require a black background, preferably of black velveteen, large enough for a head and shoulders. As the material is not usually obtainable of a width greater than twenty inches or so, there will have to



Patented May 31, 1887.

FIG. 60. MAGIC VIGNETTER.

be a seam, and this must be very neatly done. The seamed velveteen is then stretched taut on a frame, which should preferably be covered first with calico, to prevent "sagging." Always, before use, dust the velveteen with a soft brush—say, a hat brush—to remove any adhering dust or fluff. Instead of velveteen, a good paper background can be used,

only it must be seen that the surface is smooth and free from cracks or creases, and is *dead black*.

We require also a vignetting mask suitable to the subject, with a serrated edge. This has to be fixed inside the camera between the lens and plate.* The proper position can be found by trial; the further the card is away from the petal the softer and more gradual the vignetting. No special arrangement for holding this is required beyond what can be prepared by any one who can use his fingers. We take a piece of stout card,

* Avignetter for the purpose, as shown in Fig. 60, has been placed on the market.

the outside of which will just fit into the folds of the camera's bellows, and by a little twisting it can be sprung in between the folds and will hold them. There is an opening in the center, square in shape, about quarter plate size. This acts as a frame to hold the vignetting mask which has the opening of proper size and shape. By using a frame as described the vignetter can be moved about up and down and from side to side, and when the correct position is found fixed by drawing pins. The frame and vignetter should be blacked all over. For this purpose take some lampblack ground in turps, and mix with it a little gold size sufficient (found by trial) to prevent the lampblack from rubbing off when dry, but not enough to cause the paint to dry shiny.

A good distance to fix the vignetter is about one-third the extension of the camera when the object is in focus, measuring from the lens.

We adjust the camera so that the image of the figure falls in the correct position on the screen, and the vignette is made of such a size and shape as to give the amount required.

The shadow of the mask protects the edges of the plate surrounding the image, and in development we obtain a negative in which the image is vignetted into clear glass, and on printing from such the margins print dark. The printing of such a negative should be prolonged until the margins of the picture are quite lost, or they are apt to show after toning.

The sketch shows the arrangement of vignetter inside camera.

The other plan consists in making an ordinary negative, using preferably a dark background. From this is made a vignette in the ordinary manner. When this comes from the frame it is placed on a piece of clean glass—face up—and another piece of glass free from flaws placed over it. Now cut a piece of card to the size and shape of the vignetted portion of the print, and fix this with glue to a piece of cork. This piece of cork must vary in thickness with various pictures. Now place the cork on the glass so that the mask covers the picture and fix with glue to prevent slipping. Place the

whole out in diffused light, and allow the darkening of the margins to go on until sufficiently deep. The print is then toned.

The height of the card from the print must be such that no abrupt line is produced between the first printing and the darkened margin, but that one will shade into the other without break

A SIMPLE METHOD OF ENLARGING.

IF we have an ordinary gelatine negative, say, of half-plate size, and require to enlarge it to a whole plate, the simplest plan is to thoroughly wash it and immerse in a solution composed of citric acid, 2 ounces; hydrofluoric acid, 1 ounce; acetic acid (glacial), 1 ounce; glycerine $\frac{1}{2}$ ounce; water, 20 ounces. The action of the hydrofluoric acid will be to detach the film from the glass, while the other acids will cause the film to spread out considerably; the action being even all over the image is completely enlarged. It is then carefully removed and washed in plenty of clean water, after which it can be transferred to a larger piece of glass. The action is sometimes to weaken the negative in density; it is therefore occasionally necessary to intensify it.

MOONLIGHT EFFECTS.

CURIOUS as it sounds, very good moonlight effects can be procured on a bright sunshiny day. A photograph is made of a landscape in dazzling sunlight, a small stop and rapid exposure being given. The plate should, if possible, be backed with any of the substances recommended to prevent halation. Choose a landscape, with the reflection of the sun's rays in water, and include this and the sun itself on the plate. It is best to wait, however, until the sun just disappears behind a cloud. Shade the lens so that the rays do not shine on it direct, and expose rapidly. Use an old or weak devel-



Photographed from Nature by Fred. Graf.

FIG. 61. MOONLIGHT PHOTOGRAPH.

oper. The sun and its reflection will, of course, make their appearance first. Continue the development until the detail in the under-exposed parts is just visible, and fix. Print very darkly, and slightly over tone. If printing is done upon green albumenized paper, and a little re-touching with Chinese white, the effect is very good.

PHOTOGRAPHING SNOW AND ICE CRYSTALS.

Few photographers there are who appear to be aware of the many beautiful phenomena of nature that can be studied by the aid of photography. Under the title of "Schnee Crys-

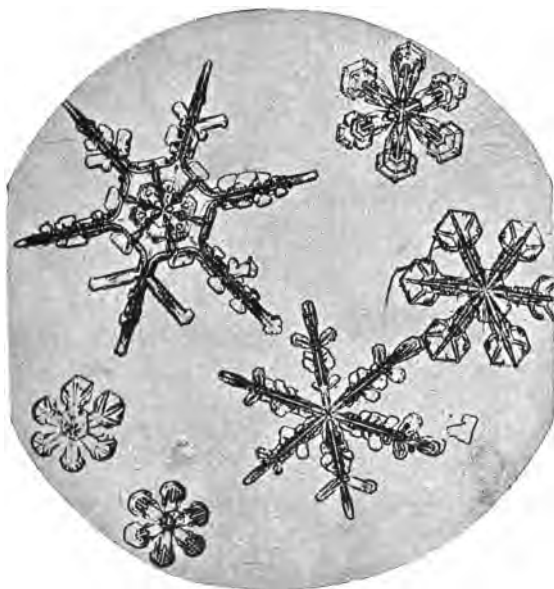


FIG. 62. SNOW CRYSTALS. PHOTO BY DR. NEUHAUS.

talle," Dr. G. Hellmann has published* a book on this subject profusely illustrated with engravings and photo-micrographic collotypes from direct photographs by Dr. R. Neuhaus.

* Rudolph Mückenberger, Berlin.

Dr. Neuhaus describes his method of photographing snowflakes in Dr. Eder's *Jarbuch*, from which article we extract the most important and interesting paragraphs: Were we to attempt to photograph snow crystals in a perfectly cold room, the temperature is still higher than that out of doors; moisture at once precipitates upon the carrier of the object, the crystals would melt and evaporate after a short time, the work must be done in the open, and perfect success can be expected only when the temperature is at least—50 deg. F.



FIG. 63. SNOW CRYSTALS. PHOTO BY DR. NEUHAUS.

Snow crystals evaporate rapidly even in low temperature, and the work requires to be done rapidly and with caution. Freshly fallen snow only will give a good photograph, and as we are compelled to work in the midst of the snow storm, the task becomes still more complicated and difficult. Snow crystals but a short time after falling break, the broken pieces freeze together and crystallization is destroyed. For the illumination of snow crystals, transmitted light only can be used, reflected light destroys the shadows, and injures the high

lights, and the result is necessarily but a very imperfect picture of the object.

Diffused light, especially that of a dark winter's day, and during a snow storm, is not fit for this kind of photo-micro-



Photo by Martin.

FIG. 64. A NATURAL PHENOMENON IN ICE.

graphic work, and we must resort to artificial light, preferably to that of a petroleum lamp. To prevent heat action emanating from the illuminating ray cone, an absorptive cell of alum

solution should be interposed. As alum solution freezes solid in—5 deg. R., chloride of sodium is added. With Hartnark's projection system = 31 mm. focus distance, from 5 to 7 seconds upon an erythrosine plate is ample.

Dr. Neuhaus has made photographs of more than 60 differ-



FIG. 65. PHOTOGRAPH OF SNOW CRYSTALS.
BY JAS. LEADBEATER.

ent ice and snow specimens. The pictures of ice crystals much resemble those of hoar frost, deposited after a cold winter's night. Of snow crystals, the doublets are highly interesting, two crystals merged into one, and those having passed through

a moist stratum of air, when microscopic drops of water will freeze into the hexagonal form, giving the picture an appearance very much resembling cauliflower.

The most difficult question of all remains, the cause of the various forms of the hexagonal crystals, which frequently



FIG. 66. PHOTOGRAPH OF FROST. BY JAS. LEADBEATER.

change in the same snowfall. Instead of advancing a new hypothesis, says Hellmann, it is better to acknowledge that we know nothing positively in regard to this. In our knowledge of the form and structure of the snow we have made great advance since the time of Kepler, but after nearly

four hundred years, we cannot give a satisfactory answer to his question, "Cur autem sexangula?"

We do not know the special conditions which determine the formation of one or the other form of snow crystals. We have found that a low temperature favors the formation of tabular crystals; a higher temperature the star shaped crystals; these groups show such multifarious forms that it is necessary to seek for other causes which influence the formation of snow figures. There is offered here a broad field for new investigation and study.

We give a reproduction Fig. 64 of a photograph of a curious group of crystals. Some water had been left in a 10 x 8 dish on a winter day, and a film of ice was seen floating on the surface. The formation of the crystals and the floral design were so beautiful that it was taken out and photographed. The delicate lace-like edging of the glacial tracery is the result of the deposition of hoar frost while draining off the water from the ice leaves and flowers and fixing the image in the camera.

Quite recently Mr Jas. Leadbeater has favored us with some account of his beautiful work in this his fascinating branch of photography, some samples of which are here given. He first makes his windows perfectly clear and waits for a keen frost. The camera is inside the room and a dark cloth-covered board was placed on the outside, leaning against a low balcony of wood. The exposure varies with the thickness of the crystals from two to ten seconds, principally with a very small stop. Two reproductions of his pictures will be found on pp. 76-77.

PHOTOGRAPHING INK CRYSTALS.

THE study of crystallization is undoubtedly an interesting and fascinating one, and photography may be made to play an important part in securing permanent records of these curious formations. If a drop of water containing a salt be allowed to drop upon a glass plate, it will upon evaporation, deposit crystals of various kinds. In a recent article in *La Nature*, by Dr. E. Trouessart, a description is given of the

beautiful crystalline forms deposited by a drop of ink on evaporation. The article is translated in the *Literary Digest*, from which we make extracts:

"Take a sheet of glass, deposit on it a drop of ink and spread the drop a little, uniformly; let it 'dry for a few minutes; then examine with a microscope, magnifying from 50 to 200 diameters, and you will be able to see the flowers of ink in process of formation under your eyes; that is to say, regular white crystal particles which detach themselves from the black or violet medium, and arrange themselves so as to form regular figures.

"If you are pressed for time, this beautiful result will easily be obtained by passing the sheet of glass over a spirit lamp or a candle to evaporate the moisture. The crystals will then be smaller and more numerous, presenting the appearance of a dark firmament densely sprinkled with bright silvery stars. But if you have patience to wait for evaporation without heat, you will obtain larger crystals of more varied forms, arranging themselves as crosses, flowers, etc.

"These crystals may be varied indefinitely by modifying the conditions of evaporation, adding more ink, etc.

But it is quite possible that different inks will give different results. The inks I use, like all the other inks in use, have a basis of sulphate of iron and gallic acid.



From "The Literary Digest."

FIG. 67. INK-CRYSTALS, AS SEEN THROUGH A MICROSCOPE.

“By allowing the evaporation to proceed slowly, it is quite easy to watch the formation of the crystals. The geometrical figures are more or less perfect cubes, pyramids, lozenges, crosses, needles, etc., the pyramids being formed by cubes superposed one on the other, as in the pyramids of Egypt. The *flowers* in our illustration are formed by the union of crystals, each of which represents the petals or sepals of a flower. The Maltese cross—the crucifer or four-leaved flower—is the normal regular form, but multiples of four frequently occur, by the formation of new crystals in the intervals; and also by the accidents of crystallization, we get flowers of three and five petals, resembling *Rubiaceæ*, lilies, orchids, violets, etc.”

PINHOLE PHOTOGRAPHY.

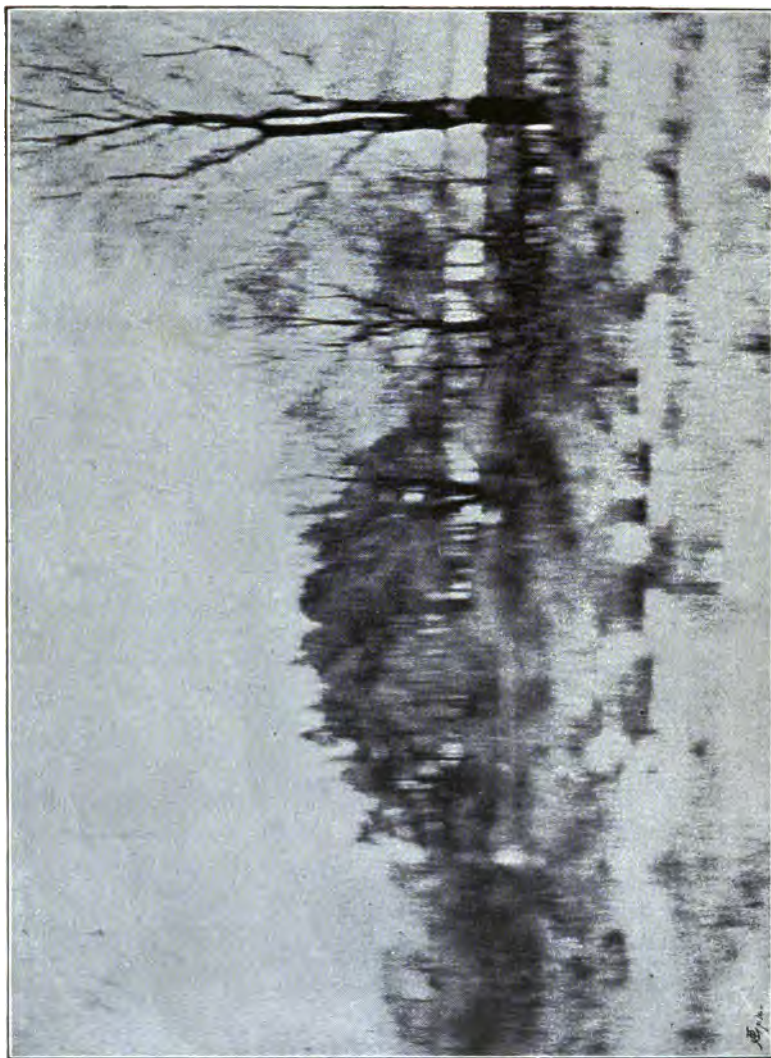
ALTHOUGH a lens is the most important part of the photographer's apparatus, it is not absolutely necessary for the production of photographs. Very good pictures can be made by means of a pinhole. Remove the lens from the camera, and insert in its place a sheet of thin, hard cardboard. In the centre make a tiny hole with a fine-pointed needle made red-hot. Another method is to make a large hole in the cardboard, and paste over it a piece of tinfoil and make the pinhole in this. The essential point is that the hole be perfectly round without any burring at the edges. The most perfect arrangement can be obtained by getting a watchmaker to drill a fine hole through a piece of sheet metal. The diameter of the hole should not be greater than the one-fiftieth of an inch. Whatever is used, cardboard or metal, it should be blackened all over to prevent the reflection of light in the camera. The focusing glass should be brought within about 6 inches of the hole. Owing to the small amount of light admitted, focusing is very difficult. It can be done by pointing the camera towards the sun and focusing its image. For the same reason the exposure is very long, ranging from ten minutes to half an hour; it is, in fact, difficult to over-expose.



Negative by F. C. Lambert.

"From Anthony's International Annual, 1894."

FIG. 68. PINHOLE PHOTOGRAPHY.



(Photo through a slit without a lens.)

By Roland Briant.

FIG. 69. THE WHITE ROBE OF NATURE.

It is usually stated that no focusing is required, the larger the plate the wider the angle, but according to Prof. Pickering, 12 inches is the maximum distance for sharp work.

Peculiar diffused effects can be obtained by using a fine slit in place of the pinhole. The picture shown on page 82 is an example.

FREAK PICTURES BY SUCCESSIVE EXPOSURES.

WE have already described the various remarkable photographic pictures which may be taken by successive exposures with the same individual in different positions against a perfectly black and non-actinic background. This, however, is not easily obtained, and a French photographer, M. Bracq, has invented an ingenious attachment to a camera by which the same effects may be obtained with any background and under the ordinary conditions of amateur photography. The following description is from *La Nature* translated in the *Popular Science News*.

The apparatus, Fig. 70, is attached to the back of the camera, and consists of a frame suitable for holding the usual ground glass, or plate holder. Directly in front of the plate holder is placed an opaque screen perforated with a horizontal slit the width of the photographic plate used. By means of a screw

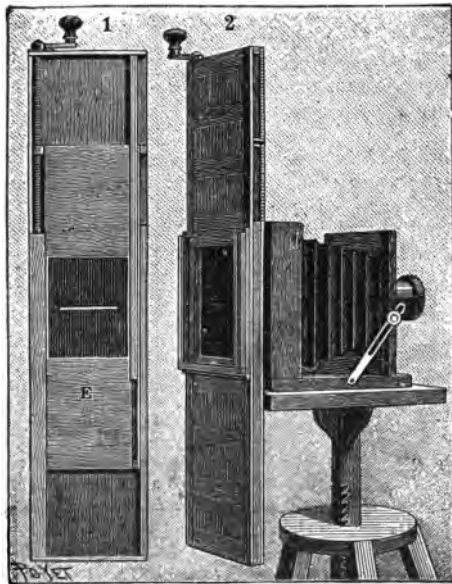


FIG. 70.

and a crank the screen with its opening may be made to move up and down before the plate, thus allowing all parts of it to be successively exposed. A pointer connected with the screen shows the position of the slit at any time when it is covered by the plate holder.

The operation of the apparatus is evident from the above description. To take the picture illustrated in Fig. 71, for instance, the table with the boy upon it is placed in the proper position and supported by planks, another table, or in any convenient way. After properly focusing it on the ground glass, the screen is screwed down till the opening is at the bottom of the camera, and the plate holder being placed in position, the slide is drawn and the handle turned till the indicator shows that the opening has reached a point corresponding to the image of the bottom of the table on the plate. The slide is then replaced in the plate holder, the table and its support removed, and the boy placed in the second position, and the exposure continued by screwing up the screen until the entire plate has been impressed with the double image, which, upon development, appears as shown in the illustration.



FIG. 71.

The slide is then replaced in the plate holder, the table and its support removed, and the boy placed in the second position, and the exposure continued by screwing up the screen until the entire plate has been impressed with the double image, which, upon development, appears as shown in the illustration.

The perforated screen may also be made to move horizontally as well as vertically across the plate, and by a combination

of the two directions the same individual may be taken four or more times in different positions in the same photograph. Many amusing and astonishing effects may be obtained by this simple means, which will readily suggest themselves to any practical photographer.

WIDE-ANGLE STUDIES.

By the use, or rather the abuse, of a lens having a very wide angle, say, 100 degrees, some very amusing effects can be



Copyright, 1894, by W. J. Demorest.

FIG. 72. A PHOTOGRAPHIC FEAT.

obtained. By apparent exaggeration of perspective—we say apparent advisedly, for if a view made with one of these



FIG. 73. A WIDE-ANGLE STUDY.

lenses, say of 5 inches focus, be viewed by the observer at a distance of 5 inches from the eye, the perspective will appear correct; but, of course, this is never done under ordinary circumstances. Every person, unless extremely short-sighted, will hold a photograph at a distance from the eye of about 12 or 14 inches.

The effect of using a wide-angle lens under ordinary conditions is to make objects in the foreground appear ridiculously large, while those in the background have a diminished appearance. Fig. 72 is an example of this; it is hardly necessary to observe that the gentleman's pedal extremities were not so gigantic as represented in the photograph. Fig. 73 is another and scarcely less painful example of this exaggeration.

In the *Practical Photographer*, some time ago, it was humorously suggested that sportsmen could, by means of the camera, bring home apparently indisputable evidence as to their skill or prowess. Thus, for instance, you and your friend Jones have been out fishing together, and realized the truth of the old saying about anglers—*i.e.*, “a worm at one end of a rod and a fool at the other.” You have, however, managed to catch a fish (any sort will do) about the dimensions of a good-sized sprat. It is the usual custom of anglers, I believe, to view their captures through magnifying-glasses before discoursing upon them. A better plan, however, is to photograph your fish, and then there can be no dispute what-



FIG. 74.



FIG. 75.

ever, because it is the popular belief that photography cannot lie. However, all that is necessary is to hang the fish in front of the camera to the bough of a tree, we will say, with a piece of black thread. You then retire several paces behind it, holding up your arm as if you were holding up the fish. Your friend will then adjust the camera so that the fish just comes under your hand, focuses, places a very small stop on, so as to get everything sharply defined, and makes the necessary exposure. Thus it is possible, with a little trouble, to obtain everlasting records of your marvelous day's sport, for you can easily make yourself appear to be holding a fish of gigantic proportions—say, 5 ft. long, or so. Fig. 74, 75.

Our illustrations are from "Photographic Pastimes" by Herman Schauss.

With a very wide-angle lens it is also possible to make a photograph of a little suburban garden, and it will appear to resemble a park or palace grounds. This is a trick often adopted by auctioneers and estate agents, so that in viewing photos of property, it is really impossible to form any safe idea regarding the place itself.

CONICAL PORTRAITS.

AMUSING caricatures may be obtained by deforming the sensitive surface of the negative. The accompanying conical portrait is one.*

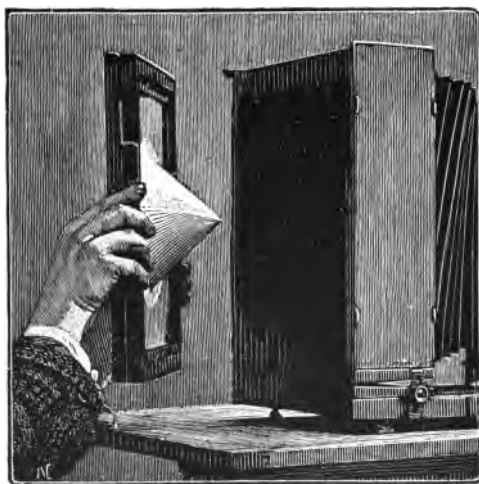


FIG. 76.

To depict the features of a person on a paper cone is not an easy matter; whilst to obtain them by photography is a tolerably simple operation.

* From "Les Recreations Photographique."



FIG. 77.



FIG. 78.

Having glued on the interior face of a plate-holder (the slide being drawn), in the place of a sensitive plate a cone made of strong card-board, superpose on it an unexposed film, which has been cut to the form of the development of the cone (as shown in Fig. 77) the film is secured by means of two or three pins. Having focused on a point of the subject in a middle plane, the ground glass is afterwards drawn back a distance equal to half the height of the cone, taking care not to derange either the subject or the objective. To obtain a sharp image a very small diaphragm must necessarily be used, but with a rapid plate and good light that is of little moment. The camera should be placed in the dark room, the lens being inserted in a hole in the partition just its size, and the subject in the adjoining apartment opposite the lens—this because the cone will not allow the plate-holder to be closed by the slide.

Fig. 76 shows the arrangement of the camera and holder. The exposure made, the film is developed, as usual. The negative gives a print deformed as shown in Fig. 76. The original, if not grotesque appearance of the head disappears when the print is rolled into a conical form and the observer places his eye in the prolongation of the axis of the cone. Fig. 78 shows the head as seen under these conditions.

MAKING DIRECT POSITIVES IN THE CAMERA.

Prepare a saturated solution in water of the crystals of thiosinamine, and add from two to eight minims of it to an ordinary pyro or eikonogen developer. Expose rather less than usual. The effect of this addition to the developing agent is an entire reversal of the image, a positive instead of a negative being obtained. Ammonia will assist the reversal. Colonel Waterhouse, the discoverer of this process, recommends in some cases the plates being subjected to a bath of 5 per cent. nitrate acid and 3 per cent. potassium bichromate before exposure, followed by a thorough washing.

INSTANTANEOUS PHOTOGRAPHY.

IN THE very earliest days of photography this term was applied to what would now be considered very slow work indeed. We now usually apply this term when the exposure does not exceed one second. In some cases this only amounts to the one-thousandth part of a second. This exceedingly brief exposure is usually given to the plate by means of a suitably constructed shutter.

The immense strides that have recently been made in instantaneous photography, owing chiefly to the advent of the dry-plate process, have caused photography to become useful to almost every branch of science.

To Muybridge and Anschütz we are greatly indebted for the strides made in instantaneous photography. These gentlemen have succeeded in photographing moving objects hitherto considered impossible to be photographed. Galloping horses, swift-flying birds, and even bullets and cannon-balls projected from guns have been successfully photographed, showing even the little head of air driven along in front of the bullet.

Both Muybridge and Anschütz have also succeeded in making series of twenty-four or more photographs of a horse during the time it makes a single leap, and thus illustrate its every movement. The value of these and other possibilities with the camera for artists cannot be overestimated. Its aid



FIG. 79.

to meteorologists in photographing the lightning, to astronomers in stellar, lunar and solar photography, and to all other sciences would require a work as large as this to describe.



By Lt. Joachim Steiner.

FIG. 80. INSTANTANEOUS STUDIES.

For the making of instantaneous pictures a large number of suitable cameras have been devised. In most of these the lens is a very rapid one, and in some cases so arranged that all objects beyond a certain distance are in focus. With an instantaneous camera a secondary image is necessary, so that the right second can be judged for making the exposure. This is usually produced by a finder. In making instantaneous exposures the following tables may be useful:

	Approximate distance per second.		
A man walking 3 miles per hour moves.....	4½	feet	per second.
A man walking 4 miles per hour moves.....	6	"	"
A vessel traveling at 9 knots per hour moves....	15	"	"
A vessel traveling at 12 knots per hour moves....	19	"	"
A vessel traveling at 17 knots per hour moves....	28	"	"
A torpedo boat traveling at 20 knots per hour moves.....	35	"	"
A trotting horse.....	36	"	"
A galloping horse (1,000 yards per minute).....	50	"	"
An express train traveling at 38 miles an hour...	59	"	"



Photochrome Engraving Co., N. Y.

FIG. 81. "A RISE IN THE WORLD."

BY THE MARQUIS DE ALFARRAS.

	Approximate distance		
	per second.		
Flight of a pigeon or falcon.....	61	feet per second.	
Waves during a storm.....	65	"	"
Express train (60 miles an hour).....	88	"	"
Flight of the swiftest birds.....	294	"	"
A cannon ball.....	1,625	"	"

An object moving—

1 mile per hour moves.....	1½	feet per second.	
2 " " ".....	3	"	"
5 " " ".....	7½	"	"
6 " " ".....	9	"	"
7 " " ".....	10½	"	"
8 " " ".....	12	"	"
9 " " ".....	13	"	"
10 " " ".....	14½	"	"
11 " " ".....	15	"	"
12 " " ".....	17½	"	"
15 " " ".....	22	"	"
20 " " ".....	29	"	"
25 " " ".....	37	"	"
30 " " ".....	44	"	"
35 " " ".....	51	"	"
40 " " ".....	59	"	"
45 " " ".....	66	"	"
50 " " ".....	73	"	"
55 " " ".....	80	"	"
60 " " ".....	88	"	"
75 " " ".....	110	"	"
100 " " ".....	147	"	"
125 " " ".....	183	"	"
150 " " ".....	220	"	"
200 " " ".....	257	"	"

With these tables it will be very easy to find the distance that the image of the object will move on the ground glass screen of the camera. To do this, multiply the focus of the lens in inches by the distance moved by the object in the second, and divide the result by the distance of the object in inches.

Example, find the movement of the image of an object moving 50 miles per hour at a distance of 100 yards with a lens of 9-inch focus.

$$9 \times 876 = 7,884 \div 3,600 = 2\frac{1}{5} \text{ inches per second.}$$

We must also find out the speed of the shutter required to take the object in motion, so that it will appear as sharply defined as possible under the circumstances. To do this the

circle of confusion must not exceed $\frac{1}{100}$ th of an inch in diameter. We therefore divide the distance of the object by the focus of lens multiplied by 100, and then divide the rapidity of the object in inches per second by the result obtained. This will give the longest exposure permissible in the fraction of a second. For example, we require to know the speed of a shutter required to photograph an express train travelling at the rate of 50 miles per hour at a distance of 50 yards with an $8\frac{1}{2}$ inch focus lens.

The train moves 876 inches per second.

$$\begin{aligned} &1,800 \text{ distance in inches} \div (8\frac{1}{2} \times 100) = 1,800 \div 850 = \frac{17}{17} \\ &876 \text{ speed of object per second} \div \frac{17}{17} = \frac{876 \times 17}{36} = 413 = \frac{1}{413} \text{ second.} \end{aligned}$$

Given the rapidity of the shutter, and the speed of the moving object, we require to find the distance from the object the camera should be placed to give a circle of confusion less than $\frac{1}{100}$ th of an inch. Multiply 100 times the focus of the lens by the space through which the object would pass during the exposure, and the result obtained will be the nearest possible distance between the object and the camera. For example, we have a shutter working at one-fiftieth of a second, and the object to be photographed moves at the rate of 50 miles per hour. How near can a camera fitted with a lens of $8\frac{1}{2}$ inch focus be placed to the moving object.

Object moving 50 miles per hour moves per second 876 inches, and in the one-fiftieth part of a second it moves 17.52 inches, so that—

$$8\frac{1}{2} \times 17.52 = 8.5 \times 100 \times 17.52 = 14,892 \text{ inches} = 413 \text{ yards.}$$

Instantaneous photography can only be successfully performed in very bright and actinic light, and should never be attempted on dull days, as under-exposure will be the inevitable result. In developing it is necessary to employ a strong developer to bring up the detail. Some operators make use of an accelerator for this purpose, but it is not to be recommended; the simplest is a few drops of hyposulphite of solution added to about 10 ounces of water. In this the plate is bathed for a few seconds previous to development.

The following is a table by H. E. Tolman showing displacement on ground glass of objects in motion:

Miles per Hour.	Feet per Second.	Distance on Ground Glass, in Inches with Object 30 Feet Away.	Same with Object 60 Feet Away.	Same with Object 120 Feet Away.
1	1½	.29	.15	.073
2	3	.59	.29	.147
3	4½	.88	.44	.220
4	6	1.17	.59	.293
5	7½	1.47	.73	.367
6	9	1.76	.88	.440
7	10½	2.05	1.03	.513
8	12	2.35	1.17	.587
9	13	2.64	1.32	.660
10	14½	2.93	1.47	.733
11	16	3.23	1.61	.807
12	17½	3.52	1.76	.880
13	19	3.81	1.91	.953
14	20½	4.11	2.05	1.027
15	22	4.40	2.20	1.100
20	29	5.87	2.93	1.467
25	37	7.33	3.67	1.833
30	44	8.80	4.40	2.200
35	51	10.27	5.13	2.567
40	59	11.73	5.97	2.933
45	66	13.20	6.60	3.300
50	73	14.67	7.33	3.667
55	80	16.13	8.06	4.033
60	88	17.60	8.80	4.400
75	110	22.00	11.00	5.500
100	147	29.33	14.67	7.333
125	183	36.67	18.33	9.167
150	220	44.00	22.00	11.000



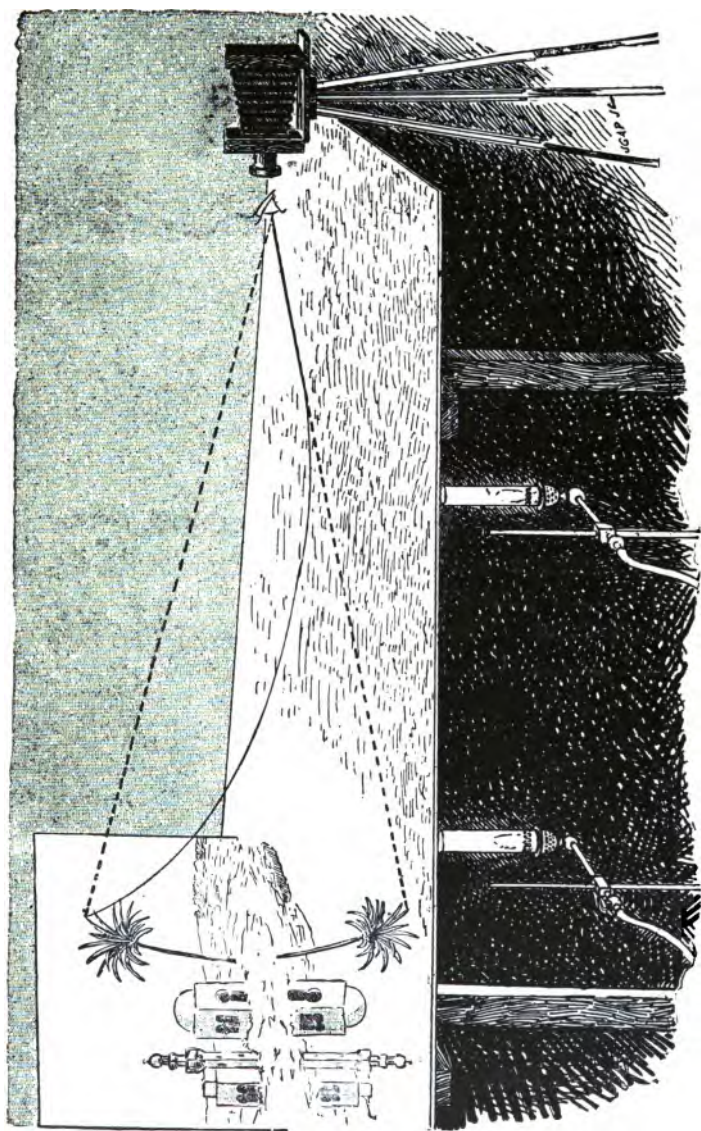


FIG. 82. ARTIFICIAL REPRODUCTION AND PHOTOGRAPHING OF A MIRAGE.

ARTIFICIAL MIRAGES BY PHOTOGRAPHY.

SOME time ago a photographer made quite a sensation by the publication of a fine photograph of a mirage, a phenomenon frequently observed on the plains of Egypt. The wily photographer had, however, never traveled away from this country. He had simply produced the effect by artificial means. A method of making these pictures was given some time ago in the *Scientific American*. A very even plate of sheet iron is taken and placed horizontally on two supports. The plate is heated uniformly and sprinkled with sand. Then a small Egyptian landscape is arranged at one end of the plate, and the photographic instrument is so placed that the visual ray shall properly graze the plate. A sketch of the arrangement is shown in Fig. 82.

THE PHOTO-CHROMOSCOPE.

THIS instrument was devised by M. Paul Nadar, the celebrated French photographer, but anyone can construct a similar apparatus. The arrangement is shown in Fig. 83.

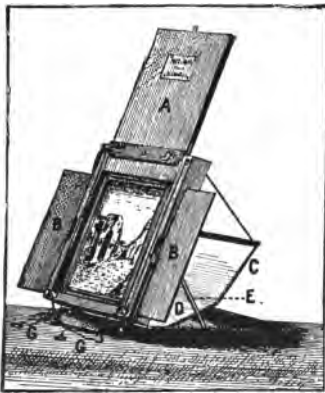


FIG. 83. NADAR'S PHOTO-CHROMOSCOPE.

The slides A and B are adjustable so that any sized picture can be inserted and the sides closed round it to shut out the light from behind. A silver print unmounted is made transparent with vaseline and placed on the glass. Pieces of paper of various colors are placed in the reflector, C, and by the means all kinds of effects can be obtained. A landscape can be viewed as though

under the pale reflected light of the rising sun behind the mountain which may be changed gradually to the full light of day.

COMPOSITE PHOTOGRAPHY.

THIS is a process of combining a number of images in such a way that the result obtained is an aggregate of its components. Francis Galton was one of the first to employ this system. In the appendix to his "Inquiries into Human Faculty," Galton has described the very elaborate and perfect form of apparatus which he has used in his studies; but entirely satisfactory results may be obtained with much more simple contrivances. The instrument used by Prof. Bowditch* is merely an old-fashioned box camera, with a hole cut in the top for the reception of the ground-glass plate upon which the image is to be reflected for purposes of adjustment. The reflection is effected by a mirror set at an angle of 45 degrees in the axis of the camera, and pivoted on its upper border so that, after the adjustment of the image, the mirror can be turned against the upper side of the box, and the image allowed to fall on the sensitive plate at the back of the camera. The original negatives are used as components, and are placed in succession in a small wooden frame which is pressed by elliptical springs against a sheet of glass fastened vertically in front of the camera. By means of this arrangement it is possible to place each negative in succession in any desired position in a plane perpendicular to the axis of the camera, and thus to adjust it so that the eyes and the mouth of its optical image shall fall upon the fiducial lines drawn upon the ground-glass plate at the top of the camera. An Argand gas burner with a condensing lens furnishes the necessary illumination.

"For our amateur photographers," writes Prof. Bowditch, "who are constantly seeking new worlds to conquer, the opportunity of doing useful work in developing the possibilities of composite photography ought to be very welcome. Not only will the science of ethnology profit by their labors, but by making composites of persons nearly related to each other, a new and very interesting kind of family portrait may be produced. The effect of occupation on the physiognomy may

* From *McClure's Magazine*, September, 1894.



Photographed by Prof. Bowditch.

From McClure's Magazine.

FIG. 84. PLATE I. TWELVE BOSTON PHYSICIANS AND THEIR COMPOSITE PORTRAIT.
THE COMPOSITE IN THE CENTRE.

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also be studied in this way. By comparing, for instance, the composite of a group of doctors with that of a group of lawyers, we may hope to ascertain whether there is such a thing as a distinct legal or medical physiognomy.

TELE-PHOTO PICTURES.

DURING the last few years many so-called tele-photographic lenses have been placed upon the market. These instruments enable one to photograph objects in the distance and obtain images very much larger than those given by the ordinary photographic lens. These lenses are, however, very costly. In an article by Mr. O. G. Mason, published in *THE PHOTOGRAPHIC TIMES* for June, 1895, that gentleman describes a

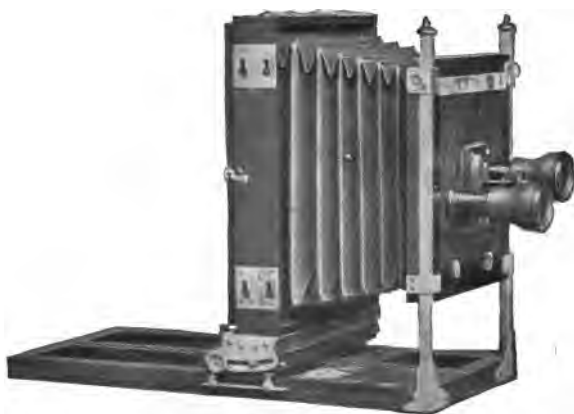


FIG. 85. CAMERA WITH OPERA GLASS ATTACHED.

simple method of obtaining tele-photo pictures by replacing the ordinary lens with an opera glass. He says: "Several devices have been brought forward with a view of decreasing the expense of tele-photo lenses, but I have seen no others so satisfactory, cheap and simple, as the utilization of the ordinary opera glass for the camera objective, which was described, figured and finally constructed for me about a year ago by Mr.

Alvin Lawrence, the horologist of Lowell, Mass. An opera or field glass is a convenient and useful instrument in the kit of any touring photographer; and when he can easily and quickly attach it to his camera-box as an objective its great value is at once made apparent. Mr. Lawrence's method of doing this at little cost is a good illustration of Yankee ingenuity. It is not claimed that such a device will do all or as well as a tele-

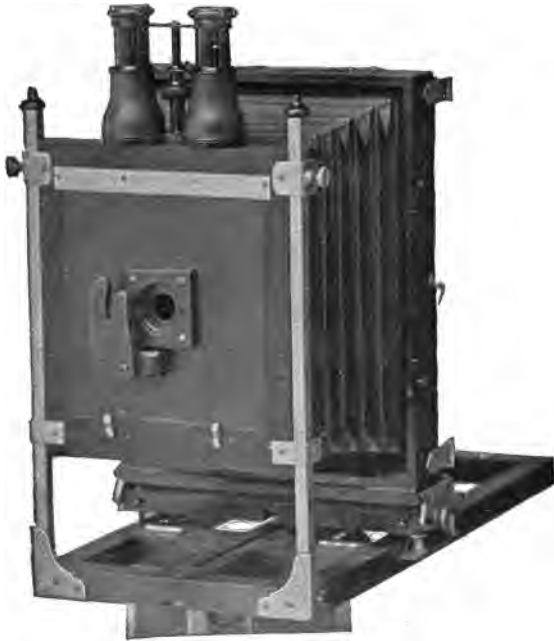


FIG. 86. CAMERA SHOWING ARRANGEMENT FOR
OPERA GLASS.

photographic lens costing ten times as much; but it will do far more than most people could or would expect. Of course the field is quite limited, which, in fact, is the case with the most expensive tele-photographic objective, and the sharpness of the image depends much upon the quality of the opera or field glass used. The accompanying views show the relative size and character of image by a forty-five dollar rapid rectil-

inear view lens and a four-dollar opera glass attached to the same camera and used at the same point. The other illustrations show the camera as used and the method of opera glass attachment to the lens-board. It will be seen that the eye end



FIG. 87. VIEW TAKEN WITH OPERA GLASS.

of the opera glass is placed against the lens-board, one eye-piece in a slight depression around the hole through the centre, and by a quarter turn the brace between the two barrels passes behind a projecting arm on the board, the focusing

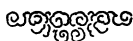
barrel resting in a slot in this arm, where it is firmly held in position by friction alone.

As opera glasses are usually constructed for vision only, no attempt is made by the optician to make correction for securing coincidence of foci of the visual and chemical rays of light



FIG. 88. VIEW TAKEN FROM SAME SPOT WITH AN ORDINARY VIEW LENS.

as in the well-made photographic objective. Hence, it is often found that the actinic focus falls within, or is shorter than, the visual. When this is the case, the proper allowance is easily made after a few trials.



LIGHTNING PHOTOGRAPHS.

THE method of making photographs of lightning flashes is



FIG. 89. PHOTOGRAPH OF LIGHTNING MADE AT BLUE HILL.

very simple. The camera is focused for distant objects.

During a thunderstorm the camera is pointed in the direction of the flashes, a plate is inserted, the cap is removed from the lens, and as soon as a flash takes place the lens is covered up and the plate is ready for development. To avoid halation a backed or non-halation plate should be used.

PHOTOGRAPHING FIREWORKS.

PHOTOGRAPHS of pyrotechnical displays can also be made at night. The method of procedure is the same as described for photographs of lightning. The camera is focused for distant objects and the lens pointed towards the place where the discharge takes place. Fig. 90.

DOUBLES.

SOME very amusing pictures can be made by double exposure. For instance, Fig 91 represents a man playing cards



FIG. 91. A DOUBLE. BY H. G. READING.

with himself. A method of making these is thus described by W. J. Hickmott in "The American Annual of Photography for 1894":



By F. R. Ziel.

FIG. 90. MOONLIGHT PHOTOGRAPH.

Night festival at the Encinal Boat Club, Alameda, Cal. Taken by moonlight, at 10.30 P. M.; exposure 40 minutes. The fireworks were set off during the last 5 minutes of exposure. Moon's declination 25° South.

Fit an open square box into the back of the camera, having it fully as large, or a little larger, than the negatives you wish to make. My attachment is made for 8 x 10 plates and under, and fits into the back of a 10 x 12 camera. In shape it is like Fig. 91, and I will designate it as A. The box is about

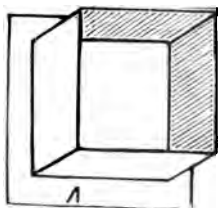


FIG. 91.

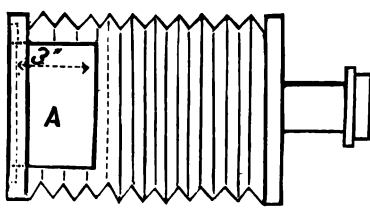


FIG. 92.



FIG. 93.

3 inches deep. When put into the camera it appears as in Fig. 92. Now have a plain strip of wood just one-half the size of the opening in A like B, Fig. 93. Have B fit very nicely in A, at the opening toward the lens, and so that it can be moved freely from one side to the other. It is very convenient to have a rabbet on the top and bottom of A so that B can be moved from side to side and maintained in any position.



FIG. 94.

To make a "Double," attach A to the camera as shown, put B into its place in the opening in A, say on the right-hand side as you stand back of your camera, thus covering up the right-hand side of the plate when exposure is made. Pose your subject on the left hand side, which will give you an image on the right-hand side of your ground glass and plate, draw the slide and expose, immediately returning the slide. This finishes one-half of the operation. Shift B over to the left-hand side of A, which will cover up that portion of the plate just exposed, pose your subject again,

but on the left-hand side, which will give you the image on the righthand side of the ground glass and plate, draw the slide and expose out for the exact length of time as at first. On development, if the exposure on both sides has been correct, and of equal length, a perfect negative will be the result.

The camera must on no account be moved between the exposures, nor the focus changed. After making the first exposure the correct focus for the second is obtained by moving the subject backward or forward until an exact focus is secured, and not by moving the camera or ground glass. The whole apparatus should be painted a dead black.

When the attachment is in place it will be noted on the ground glass that while the strip B is just one-half the size of the opening in A, it does not cut off just one-half of the ground glass, a line drawn through the center of which showing that a space in the center of the plate about one-half an inch in width receiving a double exposure, but this is not apparent in the finished negative. The figure should be posed as near the center of the plate as possible in each instance. This apparatus, as described, is only available for making two figures. By making B narrower, or one-third of the width of the opening in A, three figures may be made, using each time a separate piece to cover up that portion of the plate exposed, and by changing the form of B, to that shown in Fig. 95. four positions can be secured.

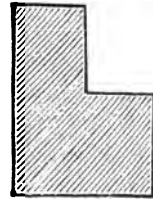


FIG. 95.

Val Starnes describes * another and still simpler method. He says: Take a light card mount and carefully cut from it a disc that will fit snugly inside the rim of the hood of your lens, resting against the circular interior shoulder (Fig. 96.). Cut from this, in a straight, true line, a small segment (Fig. 97.). The exact amount to cut off you can determine by slowly thrusting with one hand a card with a straight edge across the lens hood, looking the while at the ground glass; when the shadow has crept *almost* to the center of the

* "American Annual for 1895."

focusing screen, hold the card firmly in place and notice how much of the circle of the hood is covered by it; cut from your disc a segment corresponding to the amount *left uncovered*. Don't let the shadow creep *quite* to the center of the ground glass, for you might go the least bit beyond,

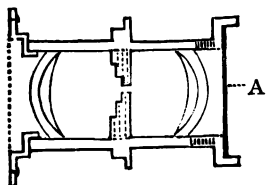


FIG. 96.

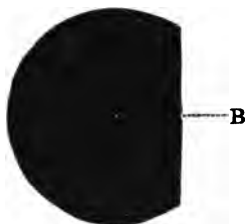


FIG. 97.

and an unexposed strip would result. Now paint your disc a dull black; loosen the hood of your lens on its threads, so that it will revolve easily and freely, and you are ready for business.

Get your focus and then place disc in hood of lens straight edge perpendicular (Fig. 98). Cover lens with cap



FIG. 98.

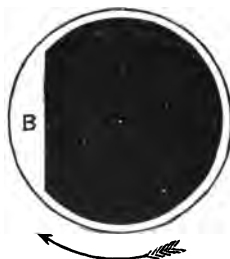


FIG. 99.

or shutter; insert plate-holder and draw slide; pose your figure *directly in front of uncovered portion of lens*; expose. Next, without touching disc, slide, or anything but the hood, gently revolve the hood on its threads one-half turn (Fig. 99), and pose your figure on opposite side; expose. The trick's accomplished.

Another arrangement devised by Mr. Frank A. Gilmore, of Auburn, R. I., is shown in Fig. 100.

A black-lined box is fitted to the front of a camera. The front of the box is closed by two doors. On opening one door a picture may be taken on one side of the plate; on closing this door and opening the other, the other half of the plate is ready for exposure.

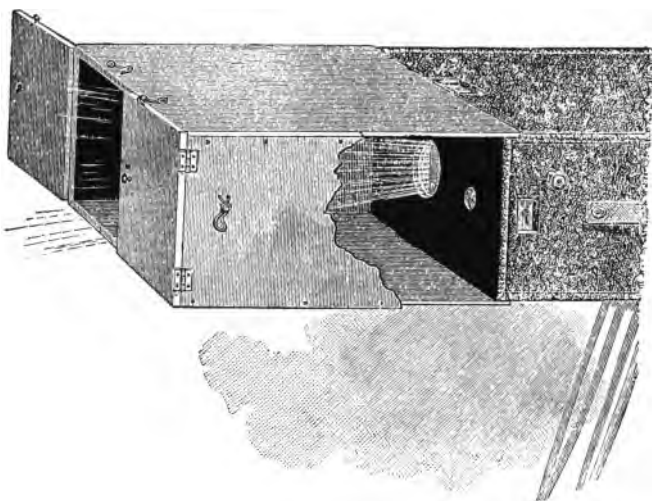
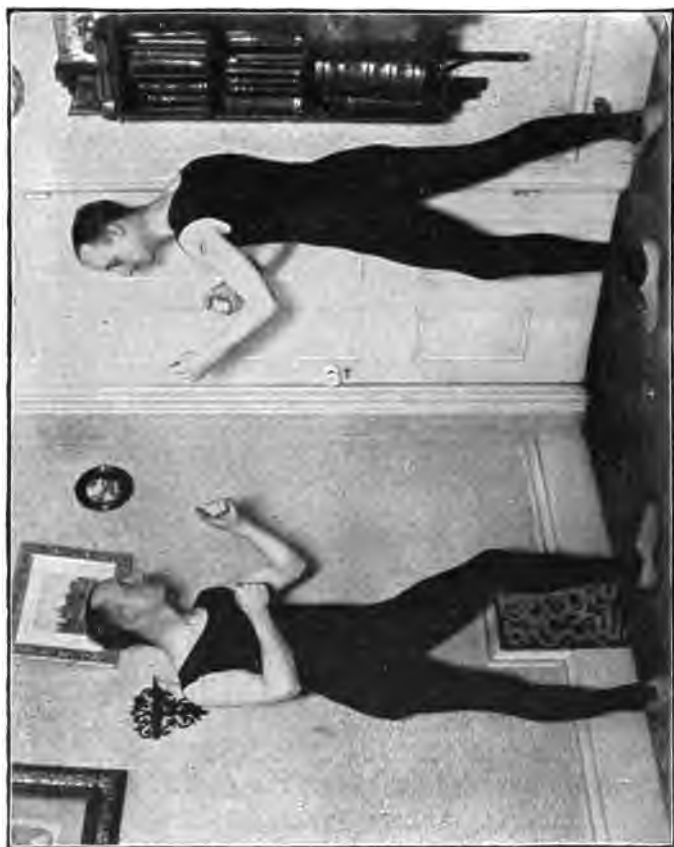


FIG. 100. CAMERA FITTED WITH ARRANGEMENT FOR DUPLEX PHOTOGRAPHY.

The subject poses in one position and is photographed with one door open, care being taken to bring the figure within the proper area of the negative. The finder enables his detail to be attended to. Then the door is closed, the other is opened and the second exposure for the other half of the plate is made with the subject in the other position. It is not necessary to touch the plate-holder between the exposures. The cover is withdrawn, the one door is opened and the shutter is sprung. The doors are then changed and the shutter is sprung a second time. Time exposures are rather risky, as involving danger of shaking. A picture made by Mr. Gilmore will be found on the next page.



By F. A. Gilmore.

From *Scientific Americans*.

FIG. 101. SPARRING WITH HIMSELF.

DOUBLE EXPOSURES.

AMATEURS often obtain unexpected results from careless-



By C. A. Bates.

FIG. 102. RESULT OF A DOUBLE EXPOSURE.

ness in exposing their plates. Some very amusing pictures



Copyright, 1894, by W. J. Demorest.

FIG. 103. RESULT OF A DOUBLE EXPOSURE.

can, however, be obtained by making two different exposures

on one plate. The subject should, of course, be of a very different nature. Our illustrations, Figs. 102-3, are examples. In making these it is necessary to give a very short exposure in each case, about one-half the amount that would be ordinarily required. The negative must be carefully developed, using plenty of restrainer. Similar effects can, of course, be obtained by printing from two different negatives, but the results are, as a rule, inferior.

COMICAL PORTRAITS.

If the photographer be skilled in drawing he can make some laughable pictures that will amuse his friends by draw-



FIG. 104.

ing a sketch of a comical body without a head, as shown in Fig. 104; a photograph of anyone is the cut out and the head pasted on.

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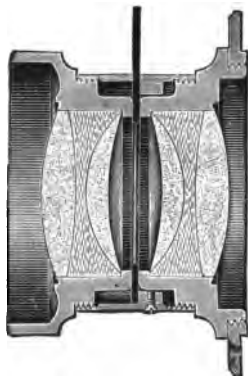


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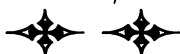


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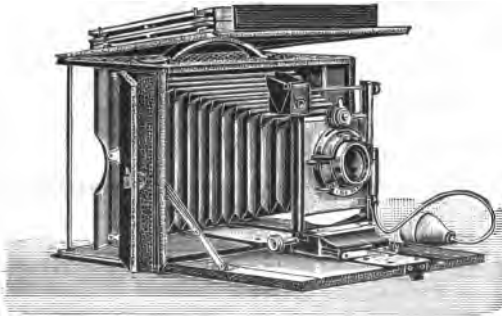


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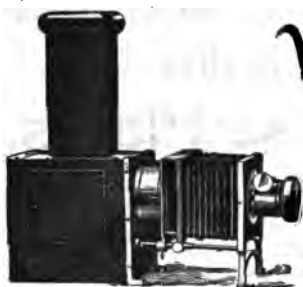
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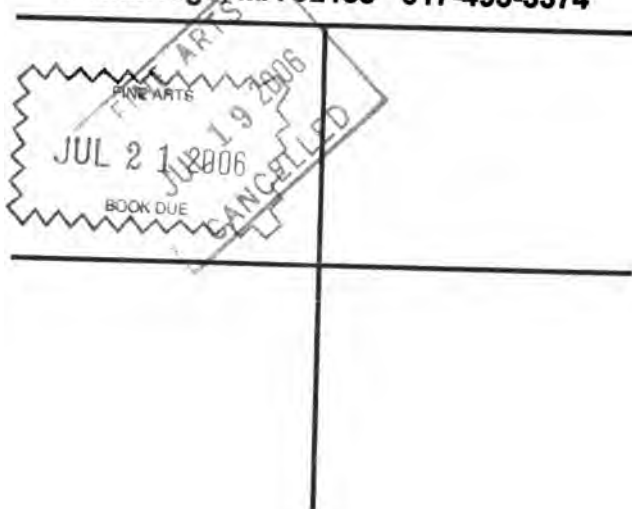
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